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The Journal of
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VOL. LXI, No. 4 NEW SERIES AUGUST 1954

THE CAUSES AND PREVENTION OF STILLBIRTHS AND FIRST WEEK DEATHS

Part III: A Classification of Deaths by Clinical Cause: the Effect of Age, Parity and Length of Gestation on Death Rates by Cause

BY

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IN two previous papers, we analyzed and discussed trends in the stillbirth and first week death rates during recent years (Duncan, Baird and Thomson, 1952; Baird, Thomson and Duncan, 1953). Socio-economic and nutritional improvements during the war years were accompanied by a reduction of deaths due to prematurity and other "ill-defined" causes; reduction of deaths due to birth trauma was associated with more widespread provision of maternity hospital facilities and specialist services, and more frequent resort to Caesarean section, especially since 1948; death rates have also been reduced to some extent by a fall in the number of high parity births.

We have now examined the clinical records of 1,008 stillbirths and first week deaths occurring among 26,116 booked Aberdeen Maternity Hospital patients (single births only) delivered during the 15-year period 1938-52. It was hoped that detailed study of the clinical circumstances and autopsy findings in these cases would throw further light on the problems of aetiology and prevention. The methods of analysis used and their results are reported and discussed in this paper. The term "obstetric deaths" is used to describe stillbirths and first week deaths together. Nearly all can be attributed to causes present during intrauterine life or resulting from the process of birth, and it is often a matter of chance whether an infant dies just before or shortly after delivery; prevention is usually therefore the responsibility of the obstetrician.

CLASSIFICATION BY MAIN CAUSE OF DEATH

Morrison (1952) has reported that autopsy fails to explain the cause of death in about 40 per cent of stillbirths and few pathologists would disagree. A further and more serious difficulty is that autopsy findings usually indicate the immediate cause of death only, and this may have little relevance from the point of view of aetiology. It is not much help to know that the baby died of "anoxia" or "prematurity and atelectasis" unless the origin of these conditions is known. Again, if a very small premature baby is found to have suffered cerebral damage, this may be little more than a sign of weakness due to under-development in a baby which would probably have died anyway. In fact severe intracranial birth trauma is surprisingly uncommon in premature babies and thus it is more important to prevent immaturity than to improve the technique of delivery of very immature babies.

A classification of deaths according to clinical findings is more meaningful in terms of causation than a classification based primarily on pathological findings. When there has been a well-defined abnormality of pregnancy or labour, it is reasonable to consider that this may be the cause of death, at least if the abnormality is sufficiently severe and in the absence of any

obvious inconsistency in such reasoning. Thus, if a baby weighing 3 pounds dies shortly after operative delivery on account of placenta praevia and is found to have a tentorial tear, it is more reasonable to attribute the death primarily to placenta praevia than to prematurity or to birth trauma.

Classification Procedure

In working over our series of 1,008 cases of obstetric death we have evolved rules of classification by clinical cause which leave little room for the exercise of individual judgment and can therefore be applied, with fairly high objectivity, to any series of cases for which reasonably detailed case-notes are available. It is realized that some of the details in our working instructions are arbitrary, but they are presented in full so that others can reproduce our methods if desired. As with a classification by autopsy findings, many cases of death (about one-third in this series) were unexplained; that is to say, the pregnancy and labour were normal, and at autopsy there were no specific lesions (other than those presumably due to anoxia). Such unexplained cases were subdivided by birth weight, as a rough means of differentiating premature cases from the remainder. Other cases (where there was a definite clinical abnormality of pregnancy or labour, or a serious foetal abnormality) were classified according to the main condition present. The following eight main groups were differentiated:

(1) Premature, cause unknown.
(2) Mature, cause unknown.
(3) Trauma.
(4) Toxaemia.
(5) Ante-partum haemorrhage.
(6) Maternal disease.
(7) Foetal deformity.
(8) Other causes (infection, Rh. factor, etc.).

The details of each are:

*Premature, cause unknown**

(i) The baby weighs 5½ pounds (approximately 2,500 g.) or less at birth but is otherwise normal. Maceration may, however, be present if death has occurred before the onset of labour. Pregnancy and labour have been clinically normal, apart from early onset of labour in most cases, and the cause of the prematurity is therefore unknown.

(ii) Even when autopsy reveals a lesion such as intracranial haemorrhage the case may be classified as "premature, cause unknown" if it is judged that a bigger and stronger baby would probably have survived. There is no clear-cut rule for differentiating such cases, but when the child weighs less than 4 pounds (approximately 1,800 g.) prematurity generally takes precedence over evidence of damage to the child, whereas with babies between 4 and 5½ pounds (approximately 1,800-2,500 g.) deaths associated with trauma and neonatal infection are classified by such immediate causes of death, it being argued that babies of this weight would not be expected to die of immaturity alone. When there has been a serious abnormality of pregnancy, such as a moderate or severe pre-eclampsia or ante-partum haemorrhage, this is considered to have been the primary cause of death, irrespective of birth weight.

Mature, cause unknown

The pregnancy has been clinically normal and the baby weighs more than 5½ pounds (2,500 g.) at birth, having suffered no more mechanical stress than that associated with normal labour. Intrauterine death may occur before the onset of labour or early in labour, or in the later stages of an easy labour. The postmortem lesions of anoxia are often found though there has been no evidence of cord constriction or undue pressure on the foetus. In some cases of normal pregnancy or labour foetal distress may occur without clinical cause and the baby may die soon after birth from respiratory failure associated with inhalation of amniotic sac contents, with or without superimposed pneumonia.

Trauma

This group comprises those cases in which a healthy baby is killed by mechanical stress during labour. It includes *all* deaths associated with breech or shoulder presentation and all cases of death due to obstruction of the cord,

* Prematurity is defined solely in terms of birth weight, without regard to length of gestation. This procedure is recognized internationally.

excepting most premature infants weighing less than 4 pounds—see "Premature, cause unknown". The decision to classify a death as traumatic depends not only on the postmortem evidence but also on the clinical characteristics of the labour and delivery and on the degree of moulding of the head. With detailed clinical notes, reasonably accurate classification is possible even without autopsy. For example, if it is judged from the degree of head moulding or the character of the labour that the foetus has been subjected to severe pressure and risk of injury the case is classified under "trauma"* rather than "mature, cause unknown", even when no definite injury is found at autopsy.

Toxaemia†

Death occurs in cases of eclampsia or of severe or moderate pre-eclampsia, either *in utero*, or postnatally, from the effects of anoxia or of prematurity (spontaneous or induced). This category includes cases of accidental haemorrhage occurring in association with pre-eclampsia.

Ante-partum haemorrhage

All deaths in cases of placenta praevia, accidental haemorrhage not associated with pre-eclampsia, and of ante-partum haemorrhage of uncertain origin.

Maternal disease

Cases in which the mother has suffered during pregnancy from an incidental medical or surgical condition, such as diabetes, pneumonia, syphilis or appendicitis, apparently leading to intra-uterine death of the foetus or to the expulsion of a feeble toxic (usually premature) baby which dies in the first week.

Deformity

Cases of foetal deformity incompatible with life or likely to have been the prime factor contributing to death. Such deformity is given priority over other existing conditions such as maternal toxaemia which, in the absence of the gross deformity, might have been considered lethal.

Other causes

It simplified analysis to combine other causes of death under a single heading "Other causes". Some of these are—(*a*) *Infection:* babies healthy at birth who die from a postnatal infection. Such infections rarely kill mature infants during the first week, but occasionally kill premature babies. As explained under "Premature, cause unknown" such a death in the case of a very small baby may be regarded as being only an incidental terminal condition; "Unexplained prematurity" or the clinical reason for premature birth taking precedence for purposes of classification. Cases of intrauterine pneumonia associated with maternal bacteraemia or with inhalation of meconium are usually classified according to the basic condition—"Maternal disease", "Mature, cause unknown", or "Trauma". (*b*) *Rhesus Factor Incompatibility:* in such cases the evidence is usually obtained by the study of the blood group and antibody titres. Classification of older records has had to be undertaken on clinical evidence alone. (*c*) *Miscellaneous:* rarities, such as haemorrhagic disease of the newborn, or cases where the only evidence available is scanty or equivocal.

Results of Classification

Table I gives the percentage distribution of deaths by clinical cause groups, among 1,008 obstetric deaths (single births) occurring in

* In the present paper, "trauma" deaths include cases where anoxic death occurred during or after prolonged labour (more than 36 hours) usually in association with abnormal uterine action, but without disproportion or occlusion of the cord. Such cases may be classified separately as "anoxia under stress", and it is debatable whether they are more akin to "trauma" or to "mature, cause unknown" deaths. (See Walker, 1954.)

† The term "toxaemia" (pre-eclampsia, eclampsia) as understood in this Unit connotes a hypertensive syndrome, with or without albuminuria, which arises for the first time after the 26th week of pregnancy and which usually subsides after delivery. The diastolic blood pressure is taken to indicate hypertension when readings of 90 mm.Hg or more are found on two separate and distinct occasions. The systolic blood pressure is not used for diagnosis. Such hypertension without albuminuria, or with albuminuria amounting to ½ part per 1,000 or less on the Esbach scale, is graded as "mild" toxaemia. Albuminuria of 2 parts or more per 1,000 (Esbach) raises the grading to "severe" toxaemia. "Moderate" toxaemia is intermediate. (See Nelson, 1954.)

TABLE I

Percentage distribution of obstetric deaths by clinical cause. (Aberdeen Maternity Hospital booked cases, 1938-52, excluding multiple births.)

Cause group	No. of pregnancy			All
	1	2-3	4+	
	Per cent	Per cent	Per cent	Per cent
Premature, cause unknown ..	18·5	20·4	22·4	19·7
Mature, cause unknown	14·7	13·9	9·9	13·7
Trauma	22·3	16·1	13·8	18·8
Toxaemia ..	11·7	8·8	7·2	10·0
Ante-partum haemorrhage ..	7·8	11·9	19·1	10·9
Foetal deformity ..	17·1	15·3	11·2	15·6
Maternal disease ..	5·2	6·5	7·2	6·0
Other causes ..	2·8	7·1	9·2	5·3
All causes	100·0	100·0	100·0	100·0
No. of obstetric deaths	503	353	152	1,008
No. of cases ..	11,830	10,913	3,373	26,116
Obstetric Death rate per 1,000 births	42·5	32·3	45·1	38·6

Aberdeen Maternity Hospital booked cases. About 33 per cent of the deaths were clinically unexplained and of these about 60 per cent were associated with prematurity of unknown origin, the remainder being unexplained deaths in mature babies. In these cases study of the clinical features of the pregnancy and labour and of the postmortem findings gives no hint of the true cause of the death or possible means of prevention. About 20 per cent of deaths were associated with birth trauma, the principal means of prevention presumably being improved management of labour. A further 20 per cent were associated with toxaemia or ante-partum haemorrhage; these might have been prevented by measures designed to mitigate the effects of the underlying disease, but this is difficult in view of our continued ignorance of the real causation of these conditions. The prevention of congenital deformities which appeared to cause 15 per cent of the total deaths is even more difficult since not only is the cause unknown but no palliative treatment is possible during pregnancy. Some of the remaining 12 per cent of deaths are capable of prevention by treating or preventing the disease in the mother which is believed to be responsible for the death.

Table I also shows that the proportion of deaths in different cause groups, as well as the death rate from all causes, varies quite markedly with parity. Officially-published national statistics show that the death rates from most causes are high in first pregnancies, less in second, and rise thereafter. They also show that deaths from most causes tend to rise as maternal age increases. Since age rises with parity, the influence of each separately can be determined only by simultaneous breakdown of the data. This has seldom been done for all causes, either of stillbirth or obstetric death, and never, so far as we know, by the separate causes of death. The data now to be presented help to remedy this deficiency. Despite the use of a 15-year series, numbers are small and death rates liable to fluctuate fairly widely by chance. Nevertheless, some interesting trends are present and it is hoped that they will stimulate others to undertake similar analyses on a larger scale.

THE INFLUENCE OF AGE AND PURITY

Table II gives obstetric death rates by cause, age and parity in the series of cases already referred to. The rates for all causes together show the expected age and parity trends; the rate is high in first pregnancies, much lower in second and third and again high in fourth and later pregnancies; in each parity the rate rises with age. This is in accordance with the known behaviour of national statistics and suggests that "selection" among hospital cases under examination is not such as to make it impossible to generalize from the data. (In a previous paper (Baird, Thomson and Duncan, 1953) we have described the extent to which Aberdeen booked hospital patients are representative of maternity patients in the city as a whole.)

The data in each cause group will now be discussed. Fig. 1 represents the data of Table II diagrammatically. Freehand curves have been drawn to indicate the trends.

Mature, cause unknown

The rate is highest in first pregnancies, and does not vary much between later pregnancies.

TABLE II

Obstetric death rates per 1,000 live and stillbirths by cause, age and number of pregnancy. (Aberdeen Maternity Hospital booked cases 1938–52: multiple births excluded.) Numbers of deaths are shown in brackets; rates based on less than 3 deaths are not calculated

Cause	No. of Preg.	15–19		20–24		25–29		30–34		35+		All Ages	
Mature, cause unknown ..	1	2·3	(4)	4·3	(25)	7·4	(21)	15·4	(15)	19·0	(9)	6·3	(74)
	2+3	—	(0)	3·1	(10)	4·0	(16)	5·3	(12)	9·7	(11)	4·5	(49)
	4+	—	(0)	—	(1)	—	(1)	4·7	(5)	6·8	(8)	4·4	(15)
Trauma + stress asphyxia	1	5·7	(10)	8·3	(48)	9·5	(27)	18·4	(18)	19·0	(9)	9·5	(112)
	2+3	—	(1)	3·7	(12)	2·7	(11)	7·1	(16)	15·1	(17)	5·2	(57)
	4+	—	(0)	—	(1)	4·4	(4)	3·7	(4)	10·3	(12)	6·2	(21)
Premature, cause unknown	1	6·3	(11)	6·0	(35)	9·8	(28)	9·2	(9)	21·1	(10)	7·9	(93)
	2+3	—	(1)	7·3	(24)	5·5	(22)	5·8	(13)	10·6	(12)	6·6	(72)
	4+	—	(0)	22·1	(5)	11·0	(10)	7·5	(8)	9·4	(11)	10·1	(34)
Toxaemia	1	7·5	(13)	2·8	(16)	4·2	(12)	9·2	(9)	19·0	(9)	5·0	(59)
	2+3	—	(2)	1·5	(5)	1·5	(6)	5·3	(12)	5·3	(6)	2·8	(31)
	4+	—	(0)	—	(0)	3·3	(3)	—	(1)	6·0	(7)	3·3	(11)
Deformity	1	9·2	(16)	7·6	(44)	7·4	(21)	3·1	(3)	—	(2)	7·3	(86)
	2+3	—	(2)	7·7	(25)	3·2	(13)	3·5	(8)	5·3	(6)	4·9	(54)
	4+	—	(0)	—	(0)	5·5	(5)	2·8	(3)	7·7	(9)	5·0	(17)
Ante-partum haemorrhage	1	—	(2)	2·9	(17)	5·3	(15)	5·1	(5)	—	(0)	3·3	(39)
	2+3	—	(0)	2·1	(7)	4·2	(17)	4·4	(10)	7·1	(8)	3·8	(42)
	4+	—	(0)	—	(1)	8·8	(8)	8·4	(9)	9·4	(11)	8·6	(29)
Maternal disease	1	1·7	(3)	1·2	(7)	2·8	(8)	4·1	(4)	8·4	(4)	2·2	(26)
	2+3	—	(1)	1·8	(6)	2·0	(8)	1·8	(4)	3·5	(4)	2·1	(23)
	4+	—	(0)	—	(0)	—	(2)	—	(2)	6·0	(7)	3·3	(11)
Infection, Rh and other ..	1	—	(2)	1·2	(7)	1·1	(3)	—	(2)	—	(0)	1·2	(14)
	2+3	—	(0)	1·8	(6)	2·5	(10)	1·3	(3)	5·3	(6)	2·3	(25)
	4+	—	(0)	—	(1)	5·5	(5)	3·7	(4)	3·4	(4)	4·2	(14)
All causes	1	35·0	(61)	34·4	(199)	47·5	(135)	66·5	(65)	90·7	(43)	42·5	(503)
	2+3	31·1	(7)	29·1	(95)	25·5	(103)	34·6	(78)	62·0	(70)	32·3	(353)
	4+	—	(0)	39·8	(9)	41·8	(38)	33·7	(36)	59·0	(69)	45·1	(152)
Total Births	1	1,744		5,790		2,845		977		474		11,830	
	2+3	225		3,266		4,036		2,257		1,129		10,913	
	4+	1		226		910		1,067		1,169		3,373	

In primiparae, the rate rises steadily from 2·3 per 1,000 in the age group 15-19 to 19·0 per 1,000 after age 35. In multiparae the rise with age is much less steep.

Trauma

This group shows somewhat similar features, there being a relatively high rate and a steep rise with age among primiparae. More detailed analysis of the cases confirms what is well known; traumatic deaths amongst primiparae occur most frequently in cases of difficult vertex delivery and in breech presentation, whereas in women of high parity they are often associated with malpresentation, prolapse of the cord and precipitate labour. In primiparae, the rate in the age group 35 and over is not much greater than at age 30-34, a fact that may be explained by

more frequent resort to Caesarean section in elderly primiparae where saving the baby is a paramount consideration. The rise with age in this cause group is expected, because the incidence of difficult labour rises steeply with age, particularly amongst primiparae (Baird, 1949, 1952). In multiparae, however, rates seem to be slightly higher in the youngest age groups shown than in the next age group.

Premature, cause unknown

The rate is lowest in second and third pregnancies and highest in 4th and subsequent pregnancies. In primiparae there seems to be a slow rise with age up to the age 30-34 after which there is a sharp increase. In second and third pregnancies there is a suggestion of high rates in the youngest and oldest cases. In fourth and subsequent pregnancies, the rates in the age groups 20-24 and 25-29 are, respectively, 3 times and 1½ times that at age 30-34. Few women have 4 or more pregnancies before age 25, so that only 5 deaths occurred in the 20-24 age group. The 5 patients concerned had had 20 previous pregnancies resulting in only 9 children who had survived the neonatal period.

The numbers of stillbirths and first week leaths are approximately equal in all parities. In about one-third of the stillbirths the pregnancy had reached 38 weeks or more, so that the foetus was more or less mature by dates, though "premature" by weight. It might therefore be argued that the somewhat arbitrary division between the "premature, cause unknown" and "mature, cause unknown" deaths on a birth weight basis has little aetiological significance. On the other hand, the rates in these two groups behave differently in relation to age and parity, and when length of gestation is discussed later it will be shown that the "mature, cause unknown" group is associated with a characteristic clinical and physiological pattern. It is believed, therefore, that the method of defining "premature, cause unknown" and "mature, cause unknown" deaths succeeds in differentiating two distinct aetiological groups.

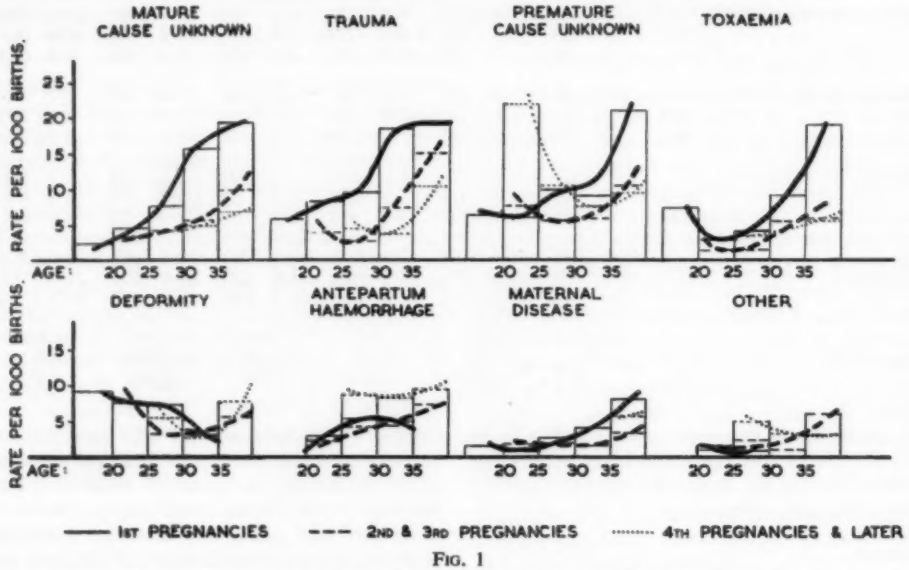


FIG. 1

Obstetric death rates by cause, age and number of pregnancy. Aberdeen Maternity Hospital booked cases, 1938-52, excluding multiple births. The histograms are based on the data in Table II. Curves have been drawn approximately through the observed points to illustrate the trends with age. The mean age of each age-group was used in plotting the observed points.

Toxaemia

Mortality is highest in first pregnancies, where the rate is lowest at age 20-24. The death rate is high in the youngest primiparae (15-19) and rises steeply after age 30, giving a J-shaped mortality curve. Numbers of deaths in multiparae are too small to give a reliable indication of the trend with age. The high death rate in the youngest primiparae* is of particular interest, since it is *not* associated with an unusually high incidence of pre-eclampsia. Nelson (1954) has studied this condition in Aberdeen Maternity Hospital booked primigravidae, 1938-51 (virtually the same series as that on which our study of obstetric deaths is based). He found that the incidences of moderate and severe pre-eclampsia, which alone were associated with excessive obstetric death rates, rose from 3·9 per cent at age 15-19 to 5·0 per cent at age 35 and over. The high obstetric death rates attributed to pre-eclampsia in very young and relatively old primiparae are therefore not due to high incidences of pre-eclampsia in the young and the elderly, but seem to be, rather, an expression of inability of the foetus at these maternal ages to withstand pre-eclampsia.

Ante-partum haemorrhage

As expected, the death rate in this group rises steadily with parity. In first, second and third pregnancies it rises with age up to 25-29, but there is no sharp rise at older ages. In primigravidae about 90 per cent of the deaths in this group are associated with accidental haemorrhage. In fourth and later pregnancies the numbers of deaths due to accidental haemorrhage and placenta praevia respectively are about equal.

Deformity

This cause of death is most common in primigravidae and high parity cases. In all parities youth is a disadvantage, the lowest rates being found around ages 30-34. A slight rise occurs in the age group 35 and over.

* The difference between rates in the age groups 15-19 and 20-24 is highly significant. For first pregnancies $X^2_{(c)}=6·5$, $P<·01$; taking first, second and third pregnancies together, $X^2_{(c)}=12·4$, $P<·001$.

Maternal disease

The medical and surgical conditions associated with obstetric death in this series were as follows: syphilis, 8 cases; diabetes, 11; cardiac conditions, 6; acute infections (mostly pyelitis), 12; miscellaneous other conditions, 23. Death rates in this group tend in all parities to rise with increasing maternal age.

Other causes (Rh. Factor, Infection, etc.)

The numbers of deaths in this group are too small for useful analysis by age and parity. Thirty-one of the total of 53 deaths were due to rhesus factor incompatibility, which becomes an important cause of death only with second and subsequent pregnancies.

An obvious disadvantage of using cases delivered over a 15-year period during which the obstetric death rate fell steeply is that the trends shown in Fig. 1 and Table II may have been changing during the period of study and more quickly for some causes than others. Another difficulty is that following a great increase in the size of the Maternity Hospital during the period under review the proportion of "booked" hospital cases among local patients increased greatly; for example, the proportion of primiparae booking for hospital doubled during the 1940's and this by itself may have affected mortality rates to some extent.

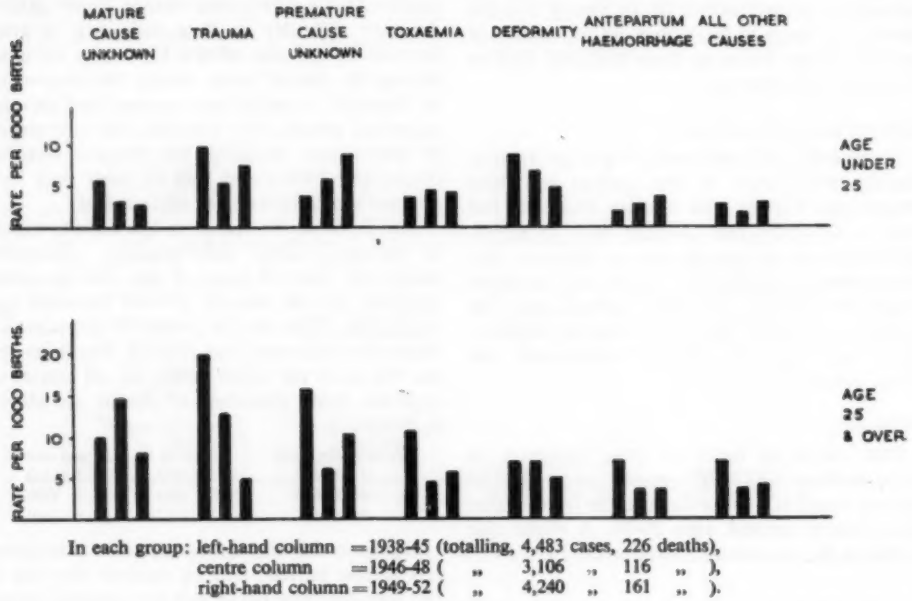
Fig. 2 shows the trends in the various causes of obstetric death, differentiating primiparae under and over 25 years of age, and grouping the data for the periods 1938-45 (pre-war and war years), 1946-48 (the period of the post-war rise in the birth rate) and 1949-52. The following are the rates per 1,000 births for all causes of obstetric death (numbers of deaths are shown in brackets):

Primiparae aged	*Under 25*	*25 and over*
1938–45	35·9 (103)	76·2 (123)
1946–48	29·1 (56)	50·7 (60)
1949–52	36·8 (101)	40·1 (60)

It is seen that the rate in the older primiparae has almost halved; and by contrast the rate in the younger primiparae was very slightly higher in 1949-52 than in 1938-45 despite a considerable fall in 1946-48.

The most important reason for the fall in

death rates in primiparae over 25 years of age is a reduction by 75 per cent in the deaths due to trauma; a fall occurred in every cause of death but in no case other than trauma is the overall reduction statistically significant. In primiparae under 25 the picture is quite different since not only is the reduction in the death rate from trauma not significant, but in the case of "premature, cause unknown" and "ante-partum haemorrhage" there has been a steady *rise* in the death rate. The rise in the incidence of "premature, cause unknown" deaths in the under 25's is unlikely to have occurred by chance, but its explanation is doubtful. It is quite certain that the rise in the overall obstetric death rate in the young women in the years 1949-52 is not due to a deterioration in the standard of obstetric care; indeed it can be stated with some confidence that the overall standard of obstetric care rose during these 3 years. The point to note at this stage is that some of the lines drawn in Fig. 1 are not representative of the position at the present time. Graphs of the current position would probably reflect the tendency of "trauma" deaths to rise with age much less accurately, because nowadays intensive obstetric care does much to overcome the "natural" disadvantage among elderly women, especially primigravidae. Any study of the effect of age and parity on obstetric death rates or childbearing generally should take into account the standard of obstetrics and methods of treatment used. In Aberdeen, Caesarean section before the onset of labour or early in labour is being used with increasing frequency among elderly primiparae to ensure a live baby. In young primiparae an extended trial of labour is allowed in cases of borderline disproportion and, although by this policy vaginal delivery is much more frequent, the risk of death of the baby from birth trauma is increased. Such young women are likely subsequently to have easier labours resulting in



In each group: left-hand column = 1938-45 (totalling, 4,483 cases, 226 deaths),
centre column = 1946-48 („ 3,106 „ 116 „),
right-hand column = 1949-52 („ 4,240 „ 161 „).

FIG. 2

Obstetric death rates by cause in 1938-45, 1946-48 and 1949-52, Aberdeen Maternity Hospital booked primiparae (excluding multiple births), differentiating primiparae aged under 25 from those aged 25 and over.

live-born children so that the slightly increased risk to the baby in the first labour, due to the sparing use of Caesarean section, may be justifiable in the long run.

The Influence of Length of Gestation

In some cases it is difficult to estimate the duration of pregnancy (taken as the time from the first day of the last menstrual period to the day of delivery) with accuracy. Menstrual data may be absent, or vague, or misleading; or the clinical course of pregnancy may not agree reasonably with the dates as recorded. Thomson (1951) has discussed some of the difficulties. Since 1948, with Aberdeen Maternity Hospital booked cases, special care has been taken to obtain menstrual data in detail and as accurately as possible; and when there is any doubt the clinical phenomena of pregnancy—particularly the rate of rise of the uterine fundus and the appearance of first foetal movements—are used as a guide. In a 5-year series (1948-52) of booked married cases the menstrual data in 86·5 per cent of cases were considered to be accurate to within one week. In the remaining 13·5 per cent of cases the gestation period was uncertain.

Table III gives the obstetric death rate by gestation period among 11,051 booked married hospital cases (all parities, legitimate single births during the 5-year period 1948-52 only). Death rates in babies born before term are high, owing to "unexplained prematurity" together with prematurity associated with such clinical abnormalities as pre-eclampsia. The table shows, confirming previous findings by Clayton (1941, 1953), Hosemann (1948), McKiddie (1949), and Walker (1953), that the death rate also rises among pregnancies prolonged past term. The reasons for the increased risks of postmaturity have received much less attention than those of prematurity. The fact that the proportion of stillbirths among obstetric deaths rises from about 60 per cent before term to about 75 per cent in cases 2 weeks or more postmature suggests that specific hazards of intrauterine life or of labour are of increasing importance after term.

In the 1948-52 series, death rates by cause and length of gestation are based on small numbers and variations by week of gestation in some cause groups are not statistically significant (Walker, 1954). Unfortunately the larger 1938-52 series cannot be used since in the clinical practice of earlier years less care was taken to check the accuracy of the estimated length of gestation. However this was done in all cases where the baby died so that fairly reliable proportional mortality rates* by length of gestation can be calculated in the larger series. Fig. 3 gives the results, three cause groups being differentiated. In both primiparae and multiparae, excess mortality in cases where pregnancy is prolonged past term is clearly due to two main groups—"mature, cause unknown"

* *Proportional mortality rate.* The ratio of deaths from a given cause to the total deaths, e.g., in the 1938-52 series of primiparae, obstetric deaths from trauma form 22·3 per cent of all deaths. (See Table I in which the rates are for deaths at all lengths of gestation together.)

Table III

Obstetric death rates and proportion of stillbirths among obstetric deaths, by length of gestation. Aberdeen Maternity Hospital booked cases, 1948–52; all parities, legitimate single births

	Week of gestation in which delivery took place							
	37th and under	38/39th	40th	41st	42nd	43rd and over	Uncertain	All
Total cases	735	1,811	2,223	2,610	1,477	701	1,494	11,051
Stillbirths	81	27	16	20	20	15	35	214
First week deaths ..	70	15	10	10	9	5	19	138
Obstetric death rate per 1,100 births	205·4	23·2	11·7	11·5	19·6	28·5	36·1	31·9
Percentage of stillbirths among obstetric deaths	53·6	64·3	61·5	66·7	69·9	75·0	64·8	60·8

and "trauma". A similar picture is shown by the data for 1948-52 alone.

Walker and Turnbull (1953) and Walker (1954) have analyzed the special hazards of the postmature foetus and have shown that they are due, essentially, to diminishing saturation with oxygen of the foetal blood. The longer pregnancy lasts beyond 40 weeks, the lower the level of oxygen in the umbilical vessels and the higher the haemoglobin level and the red cell count of the foetal blood, suggesting that the foetus is striving to make the best use of a diminishing oxygen supply. The lack of oxygen may become critical, leading to signs of foetal distress (especially passage of meconium) and if death occurs the autopsy findings are those of anoxia following respiratory efforts *in utero* (meconium and amniotic debris in the alveoli). Clinically, such deaths may occur before the onset of labour, early in labour, or during or soon after a normal easy labour, and are then classified by us as "mature, cause unknown". Where oxygen deficiency is less severe, death may occur during or soon after a prolonged labour due to dysfunction. Although at the postmortem examination only the lesions characteristic of anoxia are found, such cases are classified in the present investigation as due to "trauma"; they may, however, be separately classified as due to "anoxia under stress" (see footnote, page 435). In yet other cases death is clearly due to trauma. The incidence of major difficult labour rises with postmaturity, being about 4 times more common at the 44th than at the 40th week (Walker, 1954). Thus, the postmature foetus has to contend not only with a diminishing oxygen supply but also with an increased risk of difficult labour; this may explain why the death rate from trauma is higher in postmature than in normal cases. Similarly, relative oxygen deficiency is likely to decrease the chances of surviving other clinical conditions which predispose to death.

Analyses of local records give no grounds for believing that the incidence of pregnancies prolonged past term is affected by age, parity or the general health and nutrition of the mother to any important extent.

Discussion

Some General Considerations

It is not possible, with present knowledge, to classify a series of stillbirth and first week deaths

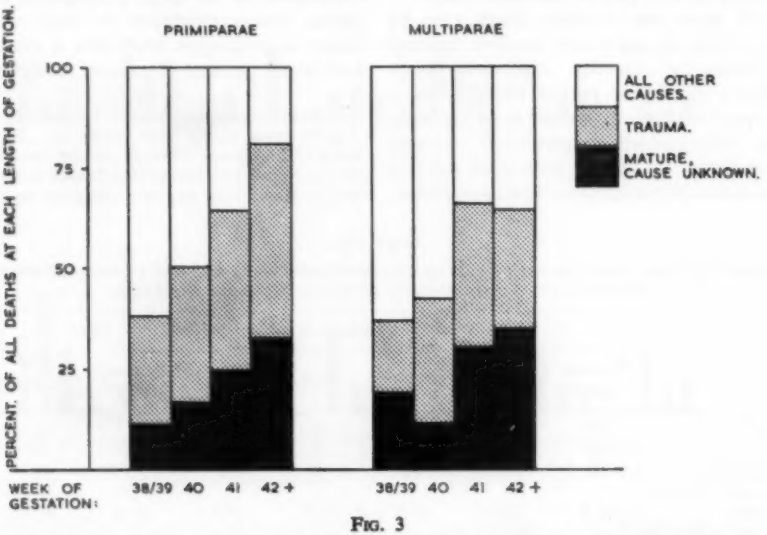


FIG. 3

Percentage distribution of causes of deaths at different lengths of gestation. Aberdeen Maternity Hospital booked cases 1938-52, excluding multiple births.

according to true underlying causes, the removal of which would be the principal aim of prevention. All forms of classification must involve compromise in greater or lesser degree. We have noted that classification based primarily on findings at autopsy is unsatisfactory both in theory and in practice, and still more comprehensive and careful autopsies would be unlikely to solve many of the residual problems of aetiology and prevention. To take into account all the clinical circumstances, as well as the pathological findings, is sounder in theory and we have found the method described to work well, provided the full case notes normally prepared in a teaching hospital are available. It seems fair to assume that obstetric deaths occurring in association with well marked clinical abnormalities of pregnancy could be substantially reduced by preventing or treating these abnormalities, and that many deaths primarily due to trauma could be avoided by improved management of difficult labour. Reduction can also be sought through careful study of those groups of patients who suffer unusually high risks; and conversely, it is important to consider why groups with unusually low risks should have this favourable experience. The epidemiological approach is specially useful in respect of deaths which cannot be explained on the basis of the clinical circumstances and pathological findings; for example "unexplained" deaths and those in which the classification is purely symptomatic, e.g., foetal deformity.

Ignoring the very few deaths in the first week due to diseases acquired during this period (nearly all infections), obstetric deaths can be attributed to three main causes:

(1) Deaths which can be prevented by skilful management of the labour ("Trauma").

(2) Deaths due to recognized diseases of the mother during pregnancy where skilled medical or obstetrical care can greatly lessen the risk to the baby.

("Toxaemia"; "ante-partum haemorrhage" especially placenta praevia; "maternal disease".)

(3) Deaths due to unexplained physiological faults or hereditary defects which are not easy to influence by medical treatment during pregnancy or obstetrical skill during labour.

("Deformity", "premature, cause unknown", "mature, cause unknown", and some forms of "ante-partum haemorrhage".)

The efficiency of the physiological processes of pregnancy is likely to be greatly influenced by the health of the mother, so that when this is low the vitality and growth of the foetus will be impaired and as a result it will more easily die should it be subjected to any additional hazard such as the effects of pre-eclampsia in the mother or difficult labour. It therefore seems probable that the three groups described above can never be clear cut but overlap in respect of fundamental aetiology. This must be kept in mind when we discuss the various factors which influence obstetric death rates.

The Influence of the Obstetrician

The part played by the obstetrician in preventing obstetric death depends to some extent on the circumstances under which he works. The lower the existing standard of obstetrics and the higher the stillbirth rate, the greater his scope. As a general rule a low obstetric death rate means a very well organized maternity service and a high standard of obstetric skill and conversely. But a very high standard of obstetrics may not produce a low obstetric death rate if the mothers are generally unhealthy.

Skilful management of labour can most easily reduce deaths due to trauma and this is illustrated in Fig. 2; during the period under review the proportion of primiparae confined in hospital was doubled and Caesarean section was performed much more often. The main improvement was in primiparae aged 25 years or over. In primiparae under 25 it was relatively slight, probably because Caesarean section is infrequently used in cases of difficult labour in young women. Another reason may be that many of the younger women came from the lower income groups of the community; where the mother lives in a poor environment and is poorly nourished during pregnancy the baby may be less able to withstand trauma during labour and delivery. At the same time uterine action is more often efficient in young women and the baby is usually pushed through the pelvis fairly quickly even when there is a slight degree of disproportion. It is more likely to be injured than if, as in many elderly primiparae, the pains are poor and

progress slow, and the stresses of delivery are avoided by Caesarean section. An immediate fall in the death rate from "trauma" in young women could be achieved only by a greatly increased use of Caesarean section, but from other points of view this course has serious disadvantages.

With regard to the second group of deaths—those due to maternal abnormalities—strenuous efforts have been made in Aberdeen to provide the best possible level of treatment, and hospital beds are now available for all patients likely to benefit from care in hospital. There does not seem to be much scope for improvement, and there is little immediate hope of reducing the obstetric death rates now experienced in this group. The most important cause of foetal death in this group is "toxaemia". We have shown (Baird, Thomson and Duncan, 1953) that a marked fall in the stillbirth rate from this cause occurred in Aberdeen between 1939 and 1945. A similar fall was noted in the Netherlands between 1940 and 1944 (Duncan, Baird and Thomson, 1952). The stillbirth rate from this cause has remained fairly steady since 1945. The reduction during the war years cannot be attributed to any great advance in medical treatment and since the war the rate has remained stationary or even tended to rise. Nelson has shown that the obstetric deaths (stillbirths and first week deaths) from "toxaemia", in primiparae at least, occur almost exclusively in the more severe forms of pre-eclampsia: 70 per cent of all deaths are in cases of pre-eclampsia so severe as to require termination of pregnancy before the 37th week. Further improvement in death rates must await new methods of preventing or treating the disease.

With regard to deaths in the third group of causes we have shown (Baird, Thomson and Duncan, 1953) that from 1939 to 1945 a fall occurred in the stillbirth rate in Aberdeen from "premature, cause unknown" and "ante-partum haemorrhage". We ascribed this to improved economic conditions and better feeding of expectant mothers under war conditions. Since 1945 there has been a slight tendency for a rise to occur in the death rate from prematurity and, less clearly, from ante-partum haemorrhage. This rise has occurred despite the fact that a much higher proportion of mothers are now under the care of specialists who have at their disposal an adequate number of hospital beds for treatment of antenatal complications. Very up-to-date nurseries are also available for the treatment of premature and ill babies and since 1945 the paediatric staff has been greatly increased.

To sum up, in our experience therefore the expansion of the obstetric and paediatric service during the last 15 years has had a marked effect in lowering the death rate from "trauma" but has had somewhat disappointing results in the other cause groups.

Great pains have been taken to raise standards of obstetric practice in Aberdeen to as high a level as possible. There are no immediate prospects of any striking advance in treatment, either medical or surgical, and until new and successful methods become available the effects of "constitutional" influences on mortality will continue to be of great importance. Some of these influences will now be considered.

Age and Parity

The data presented in Table II and Fig. 1 indicate that a first pregnancy is more hazardous, from the point of view of obstetric death, than most subsequent pregnancies. The dangers of a first pregnancy, compared with a second or third pregnancy, are specially marked in terms of death in all categories except "ante-partum haemorrhage", "maternal disease" and "other causes". In fourth and subsequent pregnancies high rates are found in these three groups and also in the "prematurity, cause unknown" group. It is noteworthy, however, that the excessive risk of "prematurity, cause unknown" deaths in high multiparae is marked only at young ages. The relative inefficiency of first pregnancies is well recognized both in man and in animals. Its causes are little understood and may be hormonal as well as mechanical; at all events, the effect is as though a "practice run" increased the efficiency of the reproductive mechanism. As parity increases beyond the second, there is slow deterioration, but severe inefficiency is marked only among high multiparae and is characterized by a high incidence of malpresentation, placenta praevia and accidental haemorrhage.

In a community where very high multiparae are comparatively rare, age appears to have more general importance than parity. For a mother to be over 35 years of age is a serious disadvantage in respect of all causes of obstetric death. It is not unreasonable to suppose that the general ageing process brings with it declining reproductive efficiency; and that lack of efficiency is particularly marked in women who have postponed childbearing for many years after the attainment of sexual maturity. It has been shown previously (Baird, Thomson and Duncan, 1953) that postponement of childbearing during the war may have been one of the factors causing a temporary increase in stillbirths in the groups "trauma" and "mature, cause unknown" in Aberdeen during the years 1946-48. As a general rule death rates increase steadily with age but there are important exceptions. Death rates in the groups "premature, cause unknown" and "toxaemia" show higher rates in primiparae under 20 years than in the 20-24 age group although after that the rate rises with age. In the case of deformity the death rate falls with age from 15-19 to 30-34 but rises again over 35. This contrasts with deaths in the "mature, cause unknown" and "trauma" groups which show the lowest rates in the youngest age groups and a steady rise with increasing age.

Fig. 4 shows how the contribution of the various causes of death to the total obstetric mortality changes with age amongst primiparae. In the youngest age group (16-19) about a quarter of the deaths are in the "trauma" and "mature, cause unknown" groups, and this proportion rises with age up to 30-34, when it accounts for about half the deaths. Amongst "elderly primiparae"—aged 35 and over—the proportion falls a little. By contrast, deaths from deformity account for about one-quarter of all deaths at age 16-19, and the proportion falls to less than 10 per cent at ages over 30.

These differences in the effect of age and parity on the various causes of obstetric death are difficult to explain unless social influences are also taken into account. All the evidence

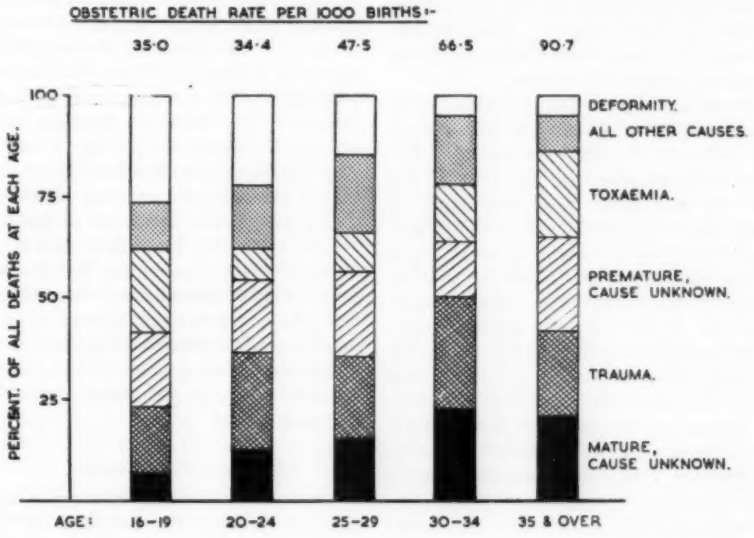


FIG. 4

Percentage distribution of causes of deaths at different ages, in primiparae. Aberdeen Maternity Hospital booked primiparae, 1938-52, excluding multiple births.

suggests that reproduction is most efficient about the age of 18 or 19 when women have just attained complete physical maturity, and thus the deaths from "mature, cause unknown" and "trauma" are lowest in the age group 15-19. However, very young mothers (under 20 years of age) mostly come from poor homes; many of the primiparae are unmarried and of those who are married the majority have conceived before marriage. We have found that most of these very young mothers are below average height and many look unhealthy. Possibly their high reproductive efficiency is neutralized in such cases by poor physique, poor general health and poor living habits. Young mothers who have several children in quick succession (e.g., those aged 20-24 with at least 3 previous pregnancies) are usually also from the poor and less well-educated class and seem to be particularly unhealthy; this may explain the very high death rate among them from "premature, cause unknown". Well educated women with high standards of living often postpone having children until the late twenties, and space their children. They usually eat a good diet and look healthy. Thus parity, and age within each parity, are influenced by social selection, which implies different levels of health and environment for the different age-and-parity groups.

Clinical experience gives the impression that the physical health of women in the poorer classes is not only impaired at maturity but deteriorates more rapidly with age than in the well-to-do, so that death rates within social classes may show different trends with age and parity. In a later paper we will examine more directly the influence of maternal health, physique and social background upon obstetric death rates in various clinical cause groups. Meanwhile the hypothesis may be advanced that the high death rates in the "premature, cause unknown", "toxaemia" and "deformity" groups in young women can be attributed to the effects of poor maternal health, physique and diet during pregnancy. This is not unexpected in the case of prematurity, in which poor health and nutrition might depress foetal growth or result in the premature onset of labour. It has already been shown that the excess of toxaemic deaths at young ages is not explained by a high incidence of pre-eclampsia and therefore may also be due to impaired vitality of the foetus, making it more susceptible to the effect of the disease. That deaths due to foetal deformity are more common at younger ages suggests that some of these also may be due in part to the effects of poor maternal health and environment rather than to genetic causes.

Deaths in the "mature, cause unknown" and "trauma" groups are uncommon at early ages and increase steeply and steadily with age, particularly among primiparae. This suggests that, despite a relatively high level of health and nutrition in the elderly primipara, the ageing process has advanced sufficiently to cause a high death rate from anoxia and birth trauma. Among the young primiparae on the other hand, any tendency to high rates in these cause groups due to poor health and nutrition is adequately counterbalanced by the advantages conferred by youth.

Length of Gestation

As already noted, the observations of Walker and Turnbull (1953) and Walker (1954) on foetal blood oxygen levels suggest that the underlying cause of death in the "mature, cause unknown" group, in pregnancies which are prolonged past term, is a failing oxygen supply. The same cause, combined with a rising incidence of difficult labour, brings about an increase in traumatic deaths after term. At present we do not know why certain pregnancies tend to be unduly prolonged and thus to involve additional hazard to the foetus. The incidence of pregnancy prolonged after the 41st week is not influenced appreciably by age or by social class among primigravidae but the deleterious effects of post-maturity are greatly mitigated by youth. The incidence of prolonged pregnancy is as high in multiparae as in primigravidae, but the effects on the foetus are less severe, possibly because labour is easier.

Conclusion

The obstetric death rate in Aberdeen has fallen to nearly half its former level. The present low level has been achieved in great part by applying the best methods of treatment available. Any relaxation of clinical standards would cause

the death rate to rise. Another broad factor contributing to the fall in the obstetric death rate, especially between 1938 and 1945, was greater purchasing power and improved diet of families. This affected more particularly death rates from unexplained prematurity and ante-partum haemorrhage (Baird, Thomson and Duncan, 1953); death rates from toxaemia also declined, but whether for the same reason remains in doubt. The downward trend in these deaths ceased in 1945. There is suggestive evidence that since 1949 this wartime trend is becoming reversed, but the overall death rate has not risen because the death rate from birth trauma has continued to fall. It is interesting to note that, as in Aberdeen, the stillbirth rates in Scotland, England and Wales have remained almost stationary since 1949, but it is not possible to say yet if the recent pattern seen in Aberdeen is typical of the national picture. There is little hope that any substantial lowering of present rates of obstetric mortality in Aberdeen can be produced by more intensive application of existing clinical knowledge; indeed, should the death rate in the groups "premature, cause unknown", "accidental haemorrhage" and "toxaemia" continue to increase, a rise in the total stillbirth and obstetric death rates might occur.

The present Aberdeen death rates are so low, particularly in relation to the national rates, that the position might be regarded as highly satisfactory. They are, however, far from the irreducible minimum suggested by Baird (1947). An unsatisfactory feature is the high proportion of women who develop complications of pregnancy requiring hospital treatment and the high incidence of operative delivery. Among elderly primiparae the obstetric death rate is kept low only by very careful management of pregnancy and labour and by frequent recourse to Caesarean section. Among young mothers in the poorer social classes, improvement in socio-economic conditions would raise levels of maternal health and lower the obstetric death rate from such causes as "premature, cause unknown", "ante-partum haemorrhage" (especially accidental haemorrhage) and "deformity". Under present conditions, the obstetrician must pay special attention to these vulnerable groups.

SUMMARY

(1) Autopsy fails to reveal the cause of stillbirth and first week death in a large proportion of cases. In any event it shows how but not necessarily why a baby dies. It was considered that a classification of causes, based mainly on the clinical circumstances leading to death, would be more helpful than one based mainly on pathological findings.

(2) A classification on such principles was devised, and details of the method are given.

(3) Application of the classification to 1,008 obstetric deaths (stillbirths plus first week deaths) occurring in 26,116 booked Aberdeen Maternity Hospital cases showed that about one-third of these deaths were "clinically unexplained", in the sense that pregnancy and labour were normal. These unexplained cases were divided into "premature, cause unknown" and "mature, cause unknown" cases, on the basis of birth weight. In the remaining cases, deaths due to birth trauma, pregnancy toxaemia, ante-partum haemorrhage, foetal deformity, maternal disease and "other causes" were differentiated.

(4) The influence of age and parity and length of gestation on the different causes of death has been studied. The incidence of deaths in the "trauma" and "mature, cause unknown" groups rises fairly steadily with maternal age, especially in primiparae. Death rates from most causes except "deformity" and "ante-partum haemorrhage" are high in primiparae aged 30 or over. Death rates in the "premature, cause unknown", "toxaemia" and "deformity" groups tend to be high in the youngest age-groups, and in the case of "premature, cause unknown" are particularly high in young multiparae. The death rate in the "mature, cause unknown" and "trauma" groups rises when pregnancy goes past term, a phenomenon which appears to be associated with defective foetal oxygenation and a relatively high incidence of difficult labour in cases of postmaturity.

(5) It is suggested that the ageing process, especially in primiparae, is associated with a decline of reproductive efficiency, and this causes a tendency for the obstetric death rate to rise with age. The "natural" rise with age is, however, obscured by two important influences. First, many deaths from trauma are nowadays avoided

by the use of Caesarean section, especially in primiparae over 25 years of age. Second, in the groups of primiparae aged under 20 and multiparae under 25 the advantages of youth in procuring a very low obstetric death rate appear to be outweighed by the ill-effects of poor growth and poor general health.

(6) The application of a very high standard of midwifery to a community helps to produce and maintain a low obstetric death rate, especially by reducing deaths from trauma. The lowest possible obstetric death rate cannot be achieved by good obstetric care alone. For this, a higher level of health among mothers and reproduction at more favourable ages would be required.

(7) The value of epidemiological research in indicating the nature of deaths which are clinically unexplained is emphasized.

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References

Baird, D. (1947): *Lancet*, **2**, 531.
Baird, D. (1949): *Lancet*, **1**, 1079.
Baird, D. (1952): *Amer. J. Obstet. Gynec.*, **63**, 1200.
Baird, D., Thomson, A. M., and Duncan, E. H. L. (1953): *J. Obstet. Gynaec. Brit. Emp.*, **60**, 17.
Clayton, S. G. (1941): *J. Obstet. Gynaec. Brit. Emp.*, **48**, 450.
Clayton, S. G. (1953): *Proc. R. Soc. Med.*, **46**, 91.
Duncan, E. H. L., Baird, D., and Thomson, A. M. (1952): *J. Obstet. Gynaec. Brit. Emp.*, **59**, 183.
Hosemann, H. (1948): *Klin. Wschr.*, **26**, 118.
McKiddie, J. M. (1949): *J. Obstet. Gynaec. Brit. Emp.*, **56**, 386.
Morrison, J. E. (1952): *Foetal and neonatal pathology*. Butterworth, London.
Nelson, T. R. (Personal Communication.)
Thomson, A. M. (1951): *Brit. J. Nutrit.*, **5**, 158.
Walker, J. (1953): In Delefresnaye, J. F., and Oppé, T. E. (ed.), *Anoxia of the newborn infant*. Blackwell, Oxford.
Walker, J. (1954): *J. Obstet. Gynaec. Brit. Emp.*, **61**, 162.
Walker, J., and Turnbull, E. P. N. (1953): *Lancet*, **2**, 312.

MALIGNANT HYPERTENSION SUPERVENING RAPIDLY ON PRE-ECLAMPSIA

BY

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IT is so extremely rare for pre-eclampsia to progress to a rapidly fatal malignant hypertension immediately following delivery that the coincidence of two such cases in our recent experience prompts us to report them in full. The illness in both patients was complicated by an acute haemolytic anaemia.

CASE REPORTS

CASE 1. M.T. 95825. AET. 34 (FIG. 1)

The patient was first seen in Hammersmith Hospital in January, 1949 when, primigravida, she visited the Antenatal Clinic in the fifteenth week of her pregnancy. She had had no significant past illness and gave no history of familial cardio-vascular disease. The blood pressure was 132/76; other findings were normal. The blood group was A, Rh positive. In the thirtieth week, the blood pressure was 150/95; there was no albuminuria. A week later oedema appeared in the hands and feet. The blood urea was 19 mg. per 100 ml., haemoglobin 11·5 g. per 100 ml. and plasma proteins 5·7 g. per 100 ml. The blood pressure remained at about 150/100 until the fortieth week when it suddenly rose to 190/120; albuminuria had not appeared. The membranes were artificially ruptured on 12th July (fortieth week) and a healthy baby was delivered. Five days after delivery the blood pressure had settled to 130/85.

On subsequent visits to the Out-patient Department the blood pressure was as follows:

August 1949	140/74
October 1949	110/70
February 1950	172/104
November 1950	150/88

She did not attend the hospital again until she came to the Antenatal Clinic in the twelfth week of her second pregnancy in January, 1952. She was in good health; the blood pressure was 120/70 and there was no oedema or albuminuria. The haemoglobin was 13·5 g. per 100 ml. The Wassermann reaction was negative. She continued well until the twenty-sixth week when she began to complain of headaches, and slight oedema involving the face, hands and feet appeared. There was gross albuminuria (440 mg. per 100 ml.) and a moderate number of granular casts were seen in the centrifuged urinary deposit. The blood pressure was 180/110. The ocular fundi were normal. On the next day the blood pressure rose to 214/142, a catheter specimen of urine contained

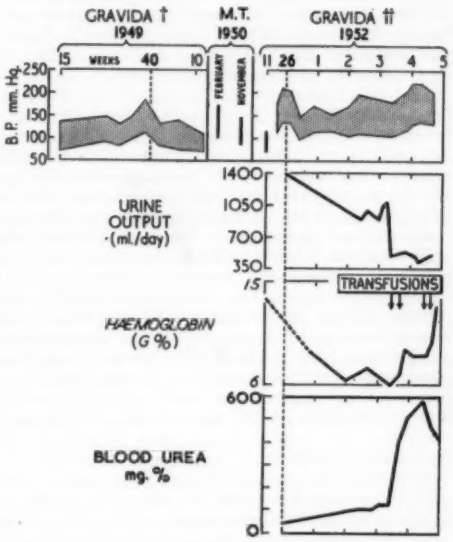

FIG. 1

Shows the blood pressure, urine output, haemoglobin and blood urea in Case 1 (M.T.).

5·5 g. of protein per 100 ml. and the blood urea was 50 mg. per 100 ml. Abdominal hysterotomy was carried out on 23rd April (the twenty-sixth week). The baby weighed 1 pound 7 ounces and survived only 8 hours. The placenta was grossly infarcted. Only moderate blood loss occurred at the operation.

The blood pressure remained elevated and albuminuria persisted though in lesser degree. Pronounced pallor appeared; on 29th April the haemoglobin was 8·9 g. per 100 ml. and on 5th May it was 6·7 g. per 100 ml. though no haemorrhage occurred in the interval. The tip of the spleen was palpable. The red cell count was 1,700,000 per c.mm., P.C.V. 20 per cent, M.C.V. 118 c.μ, M.C.H.C. 33 per cent. The white cells numbered 7,000 per c.mm. with 92 per cent polymorphs and 8 per cent lymphocytes. Subsequent red cell counts remained at about 2,000,000 and reticulocytes constituted from 15 to 23 per cent of the total. The osmotic fragility was normal. The Schumm test for the presence of methaemalbumin in the plasma was weakly positive. The direct Coombs test was negative. The blood urea was 86 mg. per 100 ml., plasma bilirubin 0·7 mg. per 100 ml.

Numerous exudates had appeared in the ocular fundi, the blood pressure was 180/110 and the heart was enlarged with a presystolic triple rhythm. The jugular venous pressure was raised and there was a lumbar pad of pitting oedema. There was only slight albuminuria; few granular casts but many pus cells were seen in the urinary deposit and a profuse growth of paracolon bacillus appeared on culture. Streptomycin was given in dosage of 1 g. daily. The urinary output remained satisfactory, but the blood urea continued to rise steadily and on the 12th May was 100 mg. per 100 ml. with urea clearance of 15 per cent of normal value.

The patient suddenly became oliguric on 17th May passing only 90 ml. in the 24 hours. Standard treatment for anuria was commenced with high caloric protein-free diet (Bull *et al.*, 1949). The urinary output remained extremely low; the blood urea had reached 413 mg. per 100 ml. on 19th May and the blood pressure 210/120. The ocular fundi showed many exudates, a few haemorrhages but not papilloedema. The anaemia was partly controlled with blood transfusions but these had to be repeated to maintain the haemoglobin level.

Over the next few days the blood pressure rose further, reaching 225/145 on 24th May, when the blood urea concentration was 572 mg. per 100 ml. and bilateral papilloedema was present. The patient's condition deteriorated steadily, moist sounds appeared in the lungs and a haemoptysis occurred in the last days of the illness, which terminated in death in coma on 1st June.

Postmortem Report 5885

A limited postmortem was carried out 3 days after death. The patient was well nourished; there were no serous effusions. The heart weighed 325 g.; there was slight left ventricular hypertrophy. The *lungs* were: right 780, left 700 g. They showed congestion, albuminous oedema, bronchitis and bilateral basal bronchopneumonia. The *alimentary system* was normal; the liver weighed 1,820 g. The *uterus* and *ovaries* were normal. The spleen weighed 260 g., it was congested. The *adrenals* were normal.

Kidneys, macroscopic: the right weighed 135 g., the left 155 g.; the size and shape were normal. The capsules stripped readily leaving a smooth mottled subcapsular surface showing a few petechiae. The cut surfaces showed a normal cortico-medullary ratio, and a blurring of the cortical pattern. The pelves, ureters and bladder were normal.

Microscopic: The general architecture was normal, there was no focal fibrosis, but a very occasional group of proximal convoluted tubules shows a total karyolysis though the accompanying sinusoids are patent. Many glomeruli appear to show an early stage of necrosis in that they are avascular and contain less nuclei than normal embedded in granular material. Others contain grossly distended capillaries as if infarcted. There is an ill-defined apparent fibrillar swelling of the basement membrane of the tuft capillaries of some glomeruli. The ascending loops of Henle, distal convoluted tubules and collecting tubules are filled with dense nonpigmented cast material. Many interlobular arteries and afferent glomerular arterioles show a striking fibrinoid necrosis (Fig. 3). This is mostly not associated with any local periarterial cellular reaction. A few interlobular arteries show quite a well marked laminated intimal thickening by proliferated fibroblasts (Fig. 4). The findings are regarded as those of a malignant nephrosclerosis with an intense necrotizing arteritis and arteriolitis.

No vascular lesions are seen in any other organs. The Kupffer cells of the liver give a strongly positive Prussian blue reaction for iron and the spleen is rich in siderophages. These findings are confirmatory of the haemolytic anaemia noted clinically but are of no specific aetiology.

CASE 2. R.R. 99146. AET. 27 (FIG. 2)

In 1949 the patient attended the hospital throughout her first pregnancy which was entirely normal. She next attended in her second pregnancy in 1952. She gave no history of past illness nor family history of cardiovascular disease, though her father had had a nephrectomy for an unascertained condition. The opportunity arose later of taking her mother's blood pressure which was 150/100 (aet. 47). The patient's blood group was A, Rh positive. The Wassermann reaction in the blood was negative.

In the twelfth week of pregnancy, November, 1952, the blood pressure was 140/80, there was no albuminuria and the haemoglobin was 16 g. per 100 ml. Further blood pressure readings at monthly intervals were: January, 1953—136/90, February—130/84, and March—126/80. She continued to be symptomatically well but on the 9th April albuminuria was found; the blood pressure was 130/82.* Next day she experienced severe headache and, on admission to the ward on 11th April, slight oedema of the face and legs and heavy albuminuria were found. The blood pressure was 170/125. The ocular fundi

* Reading made by attending midwife.

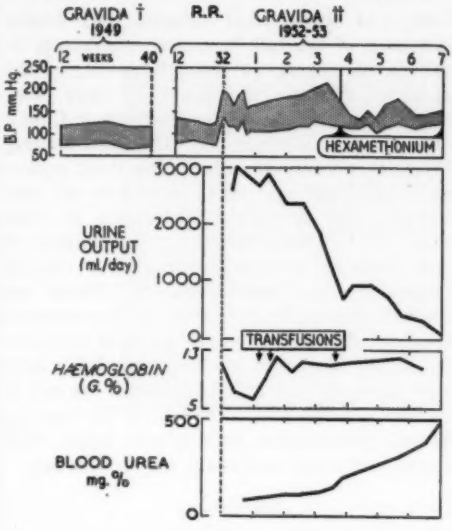

FIG. 2

Shows the blood pressure, urine output, haemoglobin and blood urea in Case 2 (R.R.).

were normal. Treatment was with a diet of low sodium content, veratrum alkaloids and sedation. The blood pressure did not fall, the degree of albuminuria increased and a small haemorrhage appeared in the fundus oculi; artificial rupture of the membranes was carried out and a still-born baby was delivered on 19th April (thirty-third week). The placenta was grossly infarcted. Blood loss was normal.

The blood pressure remained elevated in the puerperium and although the degree of albuminuria diminished it remained considerable. Pain and tenderness in the right loin suggested pyelitis and Sulphatriad followed by Streptomycin was administered. No pus cells were seen in the urine but a scanty growth of *Streptococcus faecalis* appeared on culture. Subsequent culture yielded no growth. The urinary output remained satisfactory.

On 23rd April the blood urea was 76 mg. per 100 ml. and the haemoglobin 6·9 g. per 100 ml. On 28th April the haemoglobin was 6·1 g. per 100 ml., P.C.V. 17 per cent, reticulocytes 30 per cent. Transfused blood raised the P.C.V. to 34·5 per cent. On 5th May, when the blood urea had reached a concentration of 115 mg. per cent and the blood pressure was 190/120, examination of the blood showed red cells 3,000,000 with 9 per cent reticulocytes, haemoglobin 10·3 g. per 100 ml., M.C.V. 92 c.μ, M.C.H.C. 30·5 per cent. The red cell fragility was slightly decreased. The direct Coombs test was negative. The mean life span of the patient's red cells was estimated at 16 days (normal 120). The period of observation was from 30th April to 27th May.

A week later the blood pressure was 190/130; haemorrhages and exudates had appeared in both ocular fundi as well as early papilloedema. The heart was enlarged but the venous pressure remained normal. Hexamethonium bromide therapy by subcutaneous injection was instituted and some reduction in blood pressure was achieved, but the blood urea continued to rise. Urine volume declined, presystolic triple heart rhythm appeared and the jugular venous pressure rose; later pericardial friction sounds were heard and the blood urea reached 476 mg. per 100 ml. Hiccoughing and vomiting were distressing symptoms. Death in coma occurred on 9th June.

Postmortem Report 6298

Macroscopic: The body was wasted; no serous effusions. Fibrinous pericarditis was present. The *heart* weighed 370 g. There was moderate left ventricular hypertrophy and dilatation. *Lungs:* the right weighed 470 g., the left 290 g. They were mostly well aerated with patchy solid oedema of both lower lobes. The *duodenum* and upper *jejunum* were distended with fluid. The mucosa was reddened. The ileum was contracted. The *colon* was normal; there was patchy mucosal inflammation of the *rectum*. The *liver* weighed 1,600 g.; it was normal. *Kidneys:* the right weighed 140 g., the left 140 g.; both presented a similar picture. The capsules stripped readily leaving a smooth surface which showed scattered pallid dots 1 mm. across and occasional petechiae (Fig. 5). The cut surfaces showed a normal cortico-medullary ratio. The cortex of both kidneys was widely peppered with miliary pallid necroses; the medulla was normal (Fig. 6). There were scattered petechiae in the pelves. The *uterus* and *ovaries* were normal. The *spleen* weighed 140 g. and was normal. The *adrenals* weighed 20 g. together and were rich in lipoid. The *thyroid* was rich in colloid. The *bone-marrow* of the right *femur* showed no hyperplasia. The *brain* was not examined (permission withheld).

Microscopic: Kidneys: There are numerous focal necroses in the cortex which vary from 1 to a few millimetres across (Fig. 8). The necrotic areas are made up of still recognizable tubules and glomeruli showing total karyolysis and sinusoids mostly empty of blood and filled with varying numbers of degenerate polymorphs (Fig. 6). The interlobular arteries show a striking laminated thickening of the intima by proliferated fibroblasts and an associated gross reduction of lumen (Fig. 7). A number of distal interlobular arteries are totally occluded by thrombonecrosis. There is no gross arterial dilatation. Away from necrotic areas a few glomeruli and afferent arterioles show focal fibrinoid necrosis (Fig. 8), some glomeruli show early proliferative reactive changes. A few show swelling of the basement membrane of the tuft capillaries. The collecting tubules are full of non-pigmented cast material. The medullary vessels are engorged and in addition there are a few small cortical foci of haemorrhagic congestion. There is a well marked protein-rich oedema of the connective tissue of the sinus renalis. The findings in general are those of a symmetrical focal cortical necrosis superimposed upon an advanced malignant nephrosclerosis.

The only significant finding in other organs is the presence of a very occasional example of an acute necrotizing arteriolitis with very little surrounding inflammatory cell reaction. These are seen in the uterus, ovary and rectum. The Kupffer cells of the liver give a positive Prussian blue reaction for iron and the spleen is rich in siderophages. This iron storage is an expected finding in view of the haemolytic anaemia and the treatment with blood transfusions.

Pathological Comment

The findings in the kidneys of both patients of occlusive fibroblastic intimal proliferation in the interlobular arteries and of arteriolar and glomerular tuft fibrinoid necroses are diagnostic of malignant nephrosclerosis. These changes are found in malignant hypertension irrespective of its aetiology. Neither of our two cases showed the diffuse scarred or reactive glomerular lesions or the mixed atrophic and hypertrophic tubules of an antecedent glomerulo-nephritis. Nor did they show the uneven coarse parenchymal destruction and scarring and the inflammation of the renal pelvis of chronic pyelonephritis. Polyarteritis nodosa was excluded because of the absence of active or healed lesions in the interlobular and arcuate arteries of the kidneys and in the arteries of other organs. The presence of occasional foci of necrotizing arteriolitis, without much cellular reaction, in other organs as seen in Case 2, is common in malignant hypertension. Heptinstall (1953) found extrarenal arteriolar necroses in 27 out of 47 cases of malignant hypertension of varied aetiology.

The main interest with regard to antecedents of the malignant nephrosclerosis in our two patients lies in the search for evidence of recent or persistent pre-eclamptic lesions. Unfortunately there is as yet no general agreement by morbid anatomists upon the nature and significance of the renal lesions in pre-eclampsia. Most observers are agreed that the essential lesion is an apparent thickening of the basement membrane of the glomerular tuft ascribed variously to increase in its substance (Bell, 1932) or to intracapillary fibrillar collagenization (Sheehan, 1950). The mechanism and specificity of this change are not known. Further, thickening due to an increase in basement membrane substance is commonplace in hypertension. There was some focal delicate and coarse thickening of the tuft basement membranes in both of our cases. In view, however, of the degree of autolysis in Case 1 (3 days post-mortem) and the intense focal necrosis in Case 2 with reactive changes in the surrounding glomeruli, we cannot deduce that these pathological findings are necessarily due to pre-eclampsia. At first sight the finding of focal symmetrical cortical necrosis in the kidneys of Case 2 points to pre-eclampsia. But varying degrees of focal necrosis of the kidneys are observed commonly in malignant hypertension (Sheehan and Moore, 1952), including occasionally the advanced type found in Case 2. We have other examples in our records which are not in any way associated with pregnancy. To sum up, the renal pathology in both patients is one of an intense and acute malignant nephrosclerosis.

Discussion

The aetiological relationship of pregnancy in both these cases to the onset of hypertensive vascular disease is clear cut. Normotensive in early pregnancy, the patients were afflicted with flagrant pre-eclampsia in the last trimester. The rapid appearance of oedema, gross albuminuria and acutely rising blood pressure constitutes a clear entity, in no way to be confused with the fortuitous occurrence of essential hypertension in late pregnancy.

It is in their subsequent course that they are manifestly extraordinary cases of pre-eclampsia, and the sharp contrast between the course of the disease in them and the usual one is in fact illustrated by the history of M.T. who had previously suffered from typical pre-eclamptic toxaemia quickly relieved by the termination of the pregnancy. So much a feature of the disease is this response that Dexter *et al.* (1943) make the definition of toxaemia of pregnancy conditional on a rapid diminution in the abnormalities before or soon after delivery; although the persistence of residual hypertension for long periods or even indefinitely was noted in about 25 per cent of cases. Far from responding to the termination of pregnancy, the toxaemia which we describe in these two cases merged into a state of progressive hypertension, retinopathy and papilloedema, renal failure and death in uraemia within 2 months.

FIG. 3

Kidney of Case 1. Fibrinoid necrosis of glomerular afferent arterioles. The necrosis has spread into the stalk of the capillary tuft in the lower twin glomerulus. The tubules are separated by interstitial oedema and show postmortem autolysis of their lining cells. Some contain cast material. Haemalum and Eosin. ×130.

FIG. 4

Kidney of Case 1. An interlobular artery showing occlusion of the lumen by gross fibroblastic proliferation of the intima. This is a tangential section which has exaggerated the degree of intimal fibrosis at the two poles of the vessel. Weigert's Elastic tissue stain and Neutral Red. ×240.

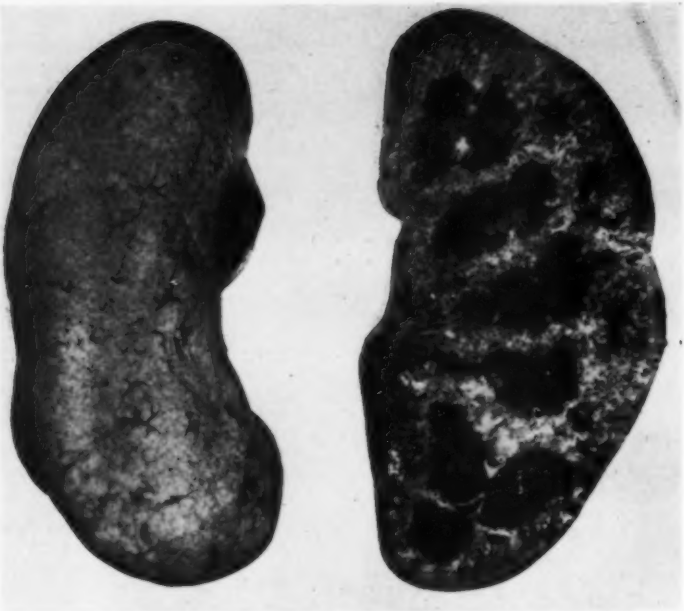

FIG. 5

Kidney of Case 2. Small pallid foci are seen at the lower pole of the subcapsular surface. The cut surface shows numerous tiny pallid necrotic foci widespread in the cortex.

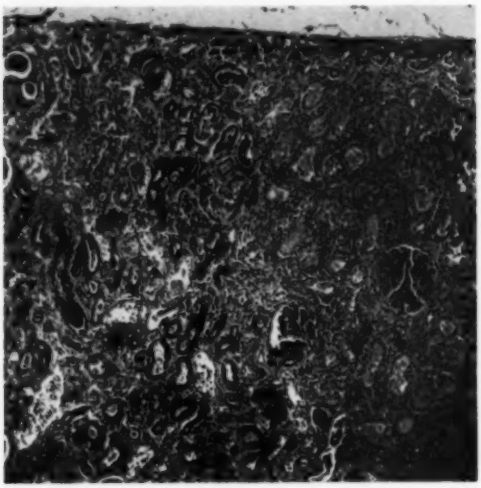

FIG. 6

Kidney of Case 2. Margin of living and necrotic cortex. The dead zone (on the right) shows a coagulative necrosis with total karyolysis. Haemalum and Eosin. ×60.

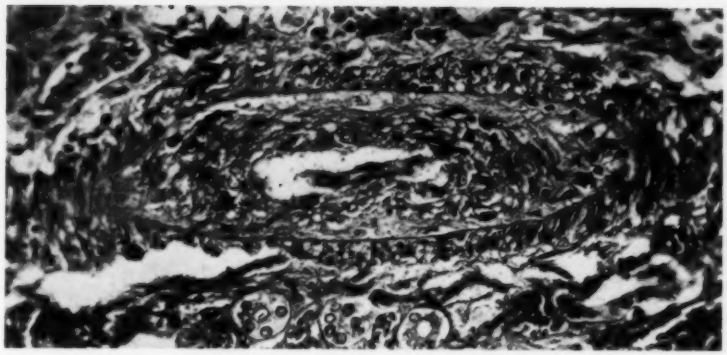

FIG. 7

Kidney of Case 2. An interlobular artery showing occlusion of the lumen by fresh fibroblastic proliferation of the intima. Haemalum and Eosin. ×240.

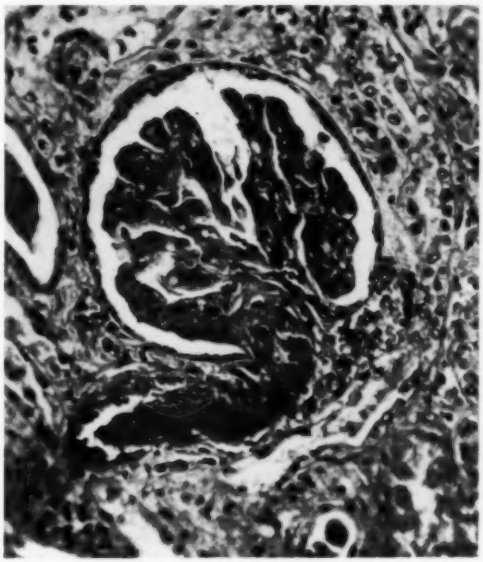

FIG. 8

Kidney of Case 2. A glomerulus showing fibrinoid necrosis of its afferent arteriole and the stalk arteriole of the tuft. Haemalum and Eosin. ×240.

The speed of development of the lesions of extensive malignant nephrosclerosis was such that therapy with methonium compounds in Case 2 was completely ineffective.

Remarkable also, and of great interest, is the anaemia which developed rapidly at an early stage after delivery. It was not accounted for by blood loss and was clearly haemolytic in nature, being accompanied by a marked reticulocytosis and in one case presenting evidence of intravascular destruction of red cells in the positive Schumm test for methaemalbumin in the plasma. In the same case the spleen was enlarged. In the other case, the estimated mean life span of the red cells was grossly reduced. Both patients were already anaemic when the blood urea was not much elevated.

Chaplin and Mollison (1953) found that the life span of transfused red cells was diminished in rapidly progressive nephritis although failure of erythropoiesis played an important part in the anaemia. The degree of reticulocytosis in both our cases in the early phase of the anaemia suggests that an acute haemolytic process was the important factor then, although later when the anaemia was advanced dyshaemopoiesis may have played a greater part.

Young (1942) remarked that the eclamptic phenomenon is apt to be associated with haemoglobinaemia and haemoglobinuria. Acute intravascular haemolysis was reported in a case of eclampsia by Kistner and Assali (1950) and in a complicated case of severe pre-eclampsia by Baker *et al.* (1953), but such reports are rare.

Cause of the Malignant Course

It is generally believed that the duration of hypertension in toxaemia is a most important factor in determining the subsequent course (Peckham, 1941). When it has continued for more than 3 or 4 weeks persistent hypertension is liable to ensue. Significantly, Golden *et al.* (1943) have been struck by the rapid progression of the course of post-toxaemic hypertension and the malignancy of the terminal phases, but they refer to a much more delayed event and none of their reported cases exhibited the continuous acute progression of these two. In one of our cases the duration of the toxaemia of pregnancy was 10 days and in the other probably about a week, periods which are too short in ordinary experience to have determined the malignancy of the condition. We must conclude that the vascular reaction in both these patients was quite exceptional from the start.

Summary

Two cases of pre-eclampsia are described which, after delivery, progressed very rapidly to malignant hypertension with fatal uraemia. The rarity of this complication is emphasized.

In the case in which it was employed treatment with methonium compounds to reduce the blood pressure was of no avail.

The coincident occurrence of acute haemolytic anaemia in both cases is of interest and remains unexplained, but may well be of prognostic significance.

Acknowledgments

We thank Professor J. McMichael and Dr. M. D. Milne for their encouragement, Mr. I. Donald for his help with the obstetrical data, Dr. P. L. Mollison for supplying the figures of the estimated life span of the red cells in Case 2, Dr. A. C. Botha for his postmortem findings in Case 1, J. G. Griffin and L. J. Wright for preparing the sections and E. V. Willmott for the photographs.

References

Baker, W. S., jr., Baker, J. P., Lussy, W. J., Bancroft, C. E., Claiborne, H. A., and Lehman, J. J. (1953): *Amer. J. Obstet. Gynec.*, **66**, 842.

Bell, E. T. (1932): *Amer. J. Path.*, **8**, 1.

Bull, G. M., Joekes, A. M., and Lowe, K. G. (1949): *Lancet*, **2**, 229.

Chaplin, H., jr., and Mollison, P. L. (1953): *Clin. Sci.*, **12**, 351.

Dexter, L., Weiss, S., Haynes, F. W., and Sise, H. S. (1943): *J. Amer. med. Ass.*, **122**, 145.

Golden, A., Dexter, L., and Weiss, S. (1943): *Arch. intern. Med.*, **72**, 301.

Heptinstall, R. H. (1953): *J. Path. Bact.*, **65**, 423.

Kistner, R. W., and Assali, N. S. (1950): *Ann. intern. Med.*, **33**, 221.

Peckham, C. H. (1941): *Amer. J. Obstet. Gynec.*, **42**, 638.

Sheehan, H. L. (1950): In *Toxaemias of pregnancy*. Ciba Foundation Symposium. Churchill, London. p. 16.

Sheehan, H. L., and Moore, H. C. (1952): *Renal cortical necrosis and the kidney of concealed accidental haemorrhage*. Blackwell, Oxford.

Young, J. (1942): *Brit. med. J.*, **2**, 715.

PREGNANCY AND ACUTE NEPHRITIS

BY

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ACUTE nephritis in pregnancy is rare, a search of the literature yielding only 23 cases. Wegner (1936) reported 6 cases, Baird and Dunn (1933) and Dieckmann (1936) 3 cases each, DeLee (1912), Eastman (1936) and Pigeaud and Michelland (1942) 2 each and 1 case was reported by Southey (1883), Wilson and Hird (1909), Keiffer (1923), Adam (1945) and Hamilton (1952). The recorded incidence varies from 0·0025 per cent (Hamilton, 1952) to 0·056 per cent (Wegner, 1936).

Certain other references to acute nephritis and pregnancy occur in the literature but most of these are based on the classification of Volhard and Fahr (1914) in which "acute nephritis" is taken to be a manifestation of "eclamptic toxaemia" and the others must also be excluded as on closer scrutiny they do not appear to have been acute Type 1 nephritis (Ellis, 1942).

Three further cases are now presented. They are of interest because they all occurred within 1 year, and 2 of the patients were members of the same household.

CASE REPORTS

CASE 1

J.L.W., gravida-3, aged 28 years, was first seen on 15th April, 1952. Both previous pregnancies had been normal.

The last menstrual period was on 27th November, 1951, and, apart from slight morning sickness, she had been well until 8th April, when she developed a sore throat. This was followed 4 days later by swelling of the face, legs and hands and her urine was "smoky".

When examined she complained of pains in her abdomen and back, and nausea, dyspnoea and oliguria. On admission to hospital she was pale and looked ill, her face was puffy and there was pitting oedema of the legs and ankles with a well-marked sacral cushion. The temperature was 99·0° F., the pulse rate 96 per minute and the blood pressure 150/80 mm.Hg. The heart sounds were normal and there was no cardiac enlargement. The neck veins were engorged, the liver was palpable 2 inches below the costal margin and moist râles were heard at the right base and midzone. The uterus was the size of a 20-weeks pregnancy.

Investigations

Urine: The specific gravity was 1010. There were numerous red blood cells, a few leucocytes, no casts and a heavy deposit of albumen. It was sterile on culture.

Blood: The haemoglobin was 8·0 g. per cent (50 per cent Haldane), the white cell count 8,000 per c.mm. Group A, Rhesus positive.

Urea: 76 mg./100 ml.

Blood sedimentation rate: 60 mm. in 1 hour (corrected for packed cell volume).

The liver function tests were normal.

Throat swab: B-haemolytic streptococci grown on culture.

Treatment

Treatment was begun with absolute bed rest, and a low protein, low salt diet with restricted fluids. The patient was given penicillin 500,000 units 12-hourly and ferrous sulphate, gr. 30 daily. There was steady improvement in her condition.

The blood urea fell from 50 mg./100 ml. on the 3rd day to 28 mg./100 ml. by the 5th week. Urinary output varied between 50 and 60 ounces daily. The albumen disappeared after 14 days; cellular and granular casts appeared in the urine on the 14th day and disappeared 6 weeks later. Red blood cells were present in decreasing numbers for 5 weeks.

Hypertension persisted for 2 months and thereafter the blood pressure was normal.

The patient was discharged from hospital on 21st June, 1952. At subsequent antenatal visits the weight gain was normal, the blood pressure was within normal limits and the urine was free of albumen. She was readmitted on 2nd August and, after a labour lasting 4 hours 20 minutes, was delivered normally of a living female infant weighing 6 pounds 4 ounces. The puerperium was uneventful.

At the postnatal examination 6 weeks later both mother and baby were well and the urine contained no albumen. The blood urea was 31 mg./100 ml. and the blood pressure 130/70 mm.Hg.

The patient was seen 8 months later. Her blood pressure was 130/80 mm.Hg; the urine contained a faint trace of albumen but there were no other abnormal constituents; the blood urea was 23 mg./100 ml. and the mean urea clearance 80 per cent of average normal.

At her final examination on 15th September, 1953, the urine was free of albumen and the blood pressure was 125/70 mm.Hg.

CASE 2

L.L., gravida-3, aged 30 years, was first seen at the antenatal clinic on 8th April, 1952. Her last menstrual period was on 15th February, 1952. There was a doubtful history of rheumatic fever in childhood and both her previous pregnancies had been normal.

On examination nothing abnormal was found in the cardio-vascular or respiratory systems. The blood pressure was 110/60 mm.Hg, there were no abnormal constituents in the urine and she weighed 9 stones 13½ pounds.

On 7th October she telephoned the hospital to say that she had not passed any urine for 2 days, and when seen gave the following history:

She had had a sore throat 14 days previously, which had been followed 7 days later by pains in the back, and for the past 2 days had had swelling of her legs, hands and face, and had not passed any urine. At her last attendance at the antenatal clinic on 3rd October she had weighed 11 stones 4 pounds, her blood pressure had been 110/70 mm.Hg and there had been no albuminuria.

On examination, the blood pressure was 120/80 mm. Hg. The face and hands were puffy and there was gross oedema of the legs and ankles. The uterus was the size of a 34-weeks pregnancy and the foetal heart was heard. The patient had gained 7½ pounds in weight in 4 days. She was admitted to hospital.

Investigations

Urine: Catheterization yielded only 1 ounce of urine, containing a heavy deposit of albumen, abundant granular casts and red cells. It was sterile on culture.

Blood: Haemoglobin 11·4 g. per cent (72 per cent Haldane). Red blood cells 3,740,000 per c.mm. White blood cells 8,200 per c.mm. Differential count normal. Group A, Rhesus positive. Urea 118 mg./100 ml. Serum proteins: Total 7·0 g./100 ml. Albumen 4·8 g./100 ml. Globulin 2·2 g./100 ml. Plasma chlorides 635 mg./100 ml. Prothrombin time 12 seconds.

Throat swab: Heavy growth of B-haemolytic streptococci, Type 12.

Treatment

Treatment was begun with absolute bed rest; she was barrier nursed in a single room and 1 litre of Bull's solution (glucose 400 g., peanut oil 100 g., water to 1 litre) was given by gastric drip over the first 24 hours, with penicillin 1·5 million units by intramuscular injection daily.

Only 6 ounces of urine were excreted in the first 48 hours. On the 5th day 20 ounces were passed and from then on there was steady improvement in urinary output and a corresponding lessening in the oedema and albuminuria. The gastric drip was discontinued on the 6th day and she was given a low protein and low salt diet with restricted fluids and added vitamins.

The blood urea rose to 129 mg./100 ml. on the 2nd day and then fell steadily to 26 mg./100 ml. on the 13th day.

There was a steady decrease in the albuminuria from an initial 4 g. per litre until it disappeared on the 11th day. Two days later albumen reappeared, and, as it persisted in small amount, labour was induced by rupture of the hind-waters on the 17th day (the patient being then 36-weeks pregnant by dates) and 9 hours later she was delivered of a living female infant weighing 6 pounds 5 ounces.

The puerperium was complicated by a *Bacterium coli* urinary infection which responded to sulphatriad 1·0 g., 8-hourly for 4 days.

The patient was discharged 2 weeks later by which time the urine was free of albumen though it still showed a few fragmented hyaline casts. The blood urea was 41 mg./100 ml. and the plasma proteins 7·8 g./100 ml. The blood pressure was 110/80 mm.Hg having remained within normal limits throughout. The baby was breast fed and weighed 6 pounds.

The patient was seen again on 22nd May, 1953. Examination of the urine showed no abnormality. The blood urea was 28 mg./100 ml. and the mean urea clearance 118 per cent of average normal.

At the follow-up examination on 15th September the blood pressure was 110/70 mm.Hg and the urine contained no albumen.

CASE 3

S.S., a primigravida, aged 29 years, and a sister of L.L. above (with whom she shared a house), was first seen at the antenatal clinic on 16th September, 1952. Her last menstrual period was on 3rd July, 1952. There was a doubtful history of "nephritis" at the age of 7 years.

On examination nothing abnormal was found in the cardio-vascular or respiratory systems. The blood pressure was 100/70 mm.Hg, there were no abnormal constituents in the urine, and she weighed 10 stones 1¼ pounds.

She was seen again on 10th October when she gave the following history:

She had had a sore throat 10 days previously followed 4 days later by pains in her back and for the past 3 days had marked swelling of her face, hands and legs.

On examination the face and hands were puffy and there was gross oedema of the legs. There were also a few erythematous nodules on her legs which she said had been there for 4 days and were now fading. The blood pressure was 120/70 mm.Hg and her weight, 10 stones 11¼ pounds. She was admitted to hospital.

Investigations

Urine: Specific gravity 1010. Albumen, moderate amount; numerous red blood cells, a few cellular and granular casts, sterile on culture.

Blood: Haemoglobin 9·4 g. per cent (64 per cent Haldane). Red blood cells 3,290,000 per c.mm. White blood cells 7,750 per c.mm. Differential count normal. Group A, Rhesus negative. Urea 41 mg./100 ml. Serum proteins: Total 6·19 g./100 ml. Albumen 3·67 g./100 ml. Globulin 2·52 g./100 ml. Chlorides 630 mg/100 ml.

Throat swab: Heavy growth of B-haemolytic streptococci, Type 12.

Treatment

The patient was isolated and she was given a low salt and low protein diet with added vitamins and penicillin 1·5 million units daily. A transfusion of 1 pint of Group A Rhesus negative blood was given on 17th October.

Her blood pressure remained low throughout the illness; the oedema gradually disappeared but the albuminuria persisted until 28th October and the blood urea remained raised until the beginning of November when it fell to 26 mg./100 ml. She was discharged from hospital on 20th November, by which time her urine was free of all abnormal constituents, her blood pressure was 120/80 mm.Hg and she weighed 10 stones 4 pounds.

She attended the antenatal clinic at regular intervals and, apart from a slight recurrence of oedema in the last month, remained well. On 4th April, 1953, she was re-admitted to hospital for rest prior to delivery. On examination there was some oedema, the blood pressure was 130/90 mm.Hg and the urine contained no abnormal constituents. The presentation was a vertex, left occipito-anterior, with the head engaged.

Surgical induction of labour was carried out on 21st April, 1953—11 days after the expected date of delivery—and 18 hours later she was delivered of a living male infant weighing 7 pounds 13 ounces.

The puerperium was complicated by a *Bacterium coli* urinary infection which responded to sulphatriad 1·0 g. 8-hourly for 4 days. By 5th May, 1953, the urine was free of all abnormal constituents and the patient was discharged.

She was seen again on 15th July, 1953. The urine contained a faint trace of albumen but no red blood cells or casts were seen. The blood urea was 38 mg./100 ml. and the mean urea clearance was 83 per cent of average normal.

At her final examination on 15th September the blood pressure was 110/60 mm.Hg and the urine contained no albumen.

Discussion

Much confusion has existed between toxaemia of pregnancy and acute nephritis coincidental with pregnancy. By emphasizing the similarity between the eclamptic kidney and the kidney of acute nephritis in the non-pregnant state, Volhard and Fahr (1914) lent support to the belief that acute nephritis and toxaemia of pregnancy were one and the same condition. In 1939, the American Committee on Maternal Health reclassified the toxaemias into two main groups—those peculiar to pregnancy and those which are not, including in the latter group hypertensive cardiovascular disease and renal disease.

Ellis (1942) simplified the whole concept of nephritis when he described the natural history of Bright's disease and reclassified it on this basis.

In acute Type 1 nephritis, to which the 3 cases described belong, there is usually a history of an upper respiratory tract infection. The onset of the disease is abrupt with malaise, swelling of the face and feet, backache and pains in the joins. Oliguria is present in 25 per cent of cases and the urine contains albumen and red blood cells. A moderate degree of hypertension is common and there is usually a raised blood urea. Recent epidemiological investigations (Rammelkamp *et al.*, 1952) show that acute nephritis frequently follows infection with the Type 12 streptococcus. In the district studied there were 16 cases of acute nephritis over a 3-year period. In 14 instances the Type 12 streptococcus was the cause of the preceding infection though it had been shown to account for only 20 per cent of all streptococcal infections in that area.

Type 12 B-haemolytic streptococci were isolated from throat swabs in 2 of the cases we describe; typing was not carried out in the third.

In acute nephritis uncomplicated by pregnancy recovery is the rule, particularly in patients seen within 2 weeks of the onset of symptoms. Death occurs in the acute stage in 4 per cent of cases; in 4 per cent the disease may progress rapidly with death in 3 to 4 months and in a further 10 per cent there is residual albuminuria followed by death many years later from hypertension and renal failure (Ellis, 1942). From the literature it would appear that the prognosis is adversely affected by pregnancy. Of the 23 cases previously reported 6 died in the acute stage of the disease and 2 became chronic.

Wegner (1936) claimed that in every case the condition was aggravated as pregnancy advanced and reported a $33\frac{1}{3}$ per cent mortality rate in the cases he described.

Dieckmann (1936) recommends therapeutic abortion if the disease is present before the 30th

week of pregnancy and shows no improvement after 2 weeks, while Adam (1945) considers that "a very relevant aspect of the management of acute diseases of the kidney complicating pregnancy is the place of therapeutic induction of abortion or of premature labour". It is generally agreed that spontaneous abortion is a frequent occurrence.

These opinions are reflected in the serious loss of foetal life among the 23 cases reported. Only 13 infants are known to have survived; there were 2 spontaneous abortions, 3 therapeutic abortions and 8 premature labours—4 of them induced, with 2 stillbirths.

Although the series is too small to allow of significant conclusions, the authors feel from a study of the 3 cases presented, that the prognosis for both mother and child is not as gloomy as has been suggested. The fact that they were all seen within a year indicates that the condition is probably more common than is generally recognized, all but the more severe cases escaping notice. In stressing the importance of early treatment Ellis (1942) showed that the recovery rate in acute nephritis falls from 90 per cent for those admitted within 1 week of the onset of symptoms to 66 per cent for those with a month's history on admission.

Treatment was instituted within 1 week of the onset of symptoms in all our cases. Conservative measures were adopted in each case, consisting in the main of absolute bed rest with restricted fluid and salt intake, but in 1 patient labour was induced at the 36th week because of superadded toxaemia and in another for post-maturity. All 3 infants survived and none of the patients seems to have any residual renal damage.

Summary

Three cases of acute Type 1 nephritis complicating pregnancy are reported and the literature reviewed.

An interesting feature was the occurrence of the disease in 2 members of the same household, in both of whom throat swabs yielded heavy growths of Type 12 streptococci.

All 3 mothers and infants survived.

While the series is small, the results suggest that with conservative treatment the course of acute nephritis is not adversely affected by pregnancy.

Acknowledgments

We wish to thank Mr. C. W. Kimbell, under whose care these patients were admitted, for permission to publish the case records, and for helpful criticism in the preparation of this paper.

Acknowledgments are due to Dr. Bertram H. Jones, Physician to the Prince of Wales's Hospital, London, in respect of the first case and to Dr. G. Konstam, Physician to the hospital in respect of the other two cases. Thanks are also due to the Director, Central Public Health Laboratory, Colindale, for typing the streptococci and supplying references to the literature.

References

Adam, G. S. (1945): *J. Obstet. Gynaec. Brit. Emp.*, **52**, 13.
Baird, D., and Dunn, J. S. (1933): *J. Path. Bact.*, **37**, 291.
DeLee, J. B. (1912): *J. Amer. med. Ass.*, **59**, 618.
Dieckmann, W. J. (1936): *Amer. J. Obstet. Gynec.*, **32**, 227.
Eastman, N. J. (1936). Personal communication quoted by Dieckmann (1936).
Ellis, A. W. (1942): *Lancet*, **1**, 1, 34.
Hamilton, H. F. H. (1952): *J. Obstet. Gynaec. Brit. Emp.*, **59**, 25.
Keiffer, H. (1923): *Gynéc. Obstét.*, **8**, 367.
Pigeaud, H., and Michelland, R. (1942): *Rev. franç. Gynéc. Obstét.*, **37**, 193.
Rammelkamp, C. H., Weaver, R. S., and Dingle, J. H. (1952): *Trans. Ass. Amer. Physcns.*, **65**, 168.
Southey, R. (1883): *Lancet*, **1**, 47.
Volhard, F., and Fahr, T. (1914): *Die Brightsche Nierenkrankeit.* Berlin.
Wegner, C. (1936). Personal communication quoted by Dieckmann (1936).
Wilson, T., and Hird, R. B. (1909): *Lancet*, **2**, 146.

THE INCIDENCE OF TOXAEMIA

BY

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IT would be useful, for a number of reasons, to know the proportion of parous women who suffer from some type of toxaemia during their childbearing career.

No statement, in these terms, has been found in the literature.

Dieckmann's (1952) study of the incidence of toxaemia is probably the most extensive. He divides toxaemia into eclampsia and "non-convulsive toxaemia". He draws attention to the higher incidence in primigravidae and to the marked geographical variations. "Non-convulsive toxaemia" is shown as having a varying incidence from 0·13 per cent in Tanganyika to 27·33 per cent in Puerto Rico. Unfortunately he does not state whether these figures refer to hospital deliveries or to the population as a whole, nor does he state the definition of "non-convulsive toxaemia" in use in the various countries listed.

Dieckmann quotes figures from various hospitals in the United Kingdom varying from 4·5 per cent to 15·3 per cent with an overall average of 9·3 per cent but again the condition is not defined.

In "Reports on Public Health and Medical Subjects" No. 94 (Ministry of Health, 1949), it is stated that "the incidence of toxaemia in hospital practice varies from 3·5 to 10 per cent of pregnancies in England; it is rarely below 5 per cent. In Manchester it is 9 per cent, in Newcastle 8·2 per cent, in London 5·8 per cent and in Liverpool 6·8 per cent. Over the country as a whole, i.e., including domiciliary practice, the incidence may be somewhat lower."

Brews (1953), however, states that in the years 1945-51 in a general practice in a large town in the South of England there was an incidence of toxaemic albuminuria of 18 per cent amongst 1,492 cases. The definition here used was the presence of albumin in a non-catheter specimen of urine accompanied by hypertension (no level is given) or oedema. During the years 1950-52 in the London Hospital there were 187 cases of pre-eclampsia and 3 cases of eclampsia in 2,630 admissions. That is, a total of 190 cases of toxaemia or 7·3 per cent.

None of these figures supplies the answer to the problem posed in the opening paragraph of this note. To obtain a statistically acceptable answer would require a long-term survey of a large number of "unselected" primigravidae followed throughout their active reproductive life.

This note has therefore been prepared to try to offer a "crude estimate" which may provide a guide to the order of magnitude of the figure until a really detailed study is undertaken. It is at once open to the objection that it relates only to findings in one large industrial city.

THE BASIS

The basis of the figures comes from the year 1951 and is derived as follows:

1. The corrected number of births (live and still) for the City of Liverpool.

2. An examination of the case histories of all women resident within the City of Liverpool who were confined in the hospitals of the City between 1st January and 31st December, 1951. More detailed information of past history of toxaemia was obtained from two hospitals.
3. Calculated incidence for patients who had a domiciliary confinement.
4. The definitions which are accepted in this paper are:

(a) *Toxaemia*
The occurrence of any two of the following:
(i) A blood pressure of 140/90 or over.
(ii) Oedema.
(iii) Albuminuria (without local cause).
Eclampsia is included as the most severe form of this group.

(b) *Hypertension*
A blood pressure of 140/90 or over occurring early in pregnancy and persisting.
(The figures for this condition have not been enumerated separately in the scrutiny of the hospital case sheets and so cannot be analyzed.)

The Total Number of Deliveries

The total corrected number of births for the City for 1951 was 15,989. The ratio of maternities to births for that year in the North Western Region (mainly Lancashire and Cheshire) was 0·987 (Registrar General, 1953). The number of women confined is therefore approximately 15,781. Of these 15,364 have been accounted for as follows:

Delivered in Hospital	10,876
Delivered by Domiciliary midwives	4,066
Delivered in Nursing Homes ..	422
Total	15,364

There are thus approximately 417 mothers who have not been traced. It can, however, be assumed that none of these was toxaemic as virtually all women in the area with any abnormality of pregnancy are admitted to hospital.

Parity

The total figures for confinements in hospitals are divided into 4,407 primiparae and 6,469 multiparae. Similarly, domiciliary midwives delivered 382 primiparae and 3,684 multiparae.

There is no record of this division for the 422 patients cared for in nursing homes. It is therefore assumed that the division is in the same ratio as that of the sums of the above, i.e., 4,789 primiparae and 10,153 multiparae. This roughly gives figures of 135 and 287 respectively. A similar supposition must be made about the 417 untraced confinements, yielding a further 133 primiparae and 284 multiparae.

Thus the combined totals are—primiparae 5,057 and multiparae 10,724.

Incidence of Toxaemia

All the information about hospital deliveries has been carefully compiled from the case sheets of the five maternity units in the City as set out in "the basis" paras. 2 and 3.

(a) *Primigravidae*

Table I

	Admissions	Toxaemia	Percentage
Hospital A ..	866	85	9·8
Hospital B ..	551	42	7·6
Hospital C ..	864	107	12·4
Hospital D ..	1,268	136	10·7
Hospital E ..	858	60	7·0
Total ..	4,407	430	9·8

This figure of 9·8 per cent agrees very closely with the statement frequently made that 10 per cent of primigravidae in hospitals suffer from toxaemia. The figures for the individual hospitals do not differ seriously from those of the group as a whole. The important figure is the total number of patients who suffered from toxaemia (430) for we are dealing with a condition standardized by the definition given above in "the basis" para. 4. The only significance to be attached to the percentage figure is to show that the hospitals deal with a roughly comparable "population". This comment also applies to Table II for multigravidae who suffered from toxaemia in their 1951 pregnancy.

Under the rules of the Central Midwives Board any abnormality must be reported to a doctor at once. The Local Executive Council have informed us that the practice amongst doctors in this area is to refer any patient (primigravida or multigravida) who shows evidence of toxaemia to hospital at once. We must therefore assume that the figure of 430 primigravidae suffering from toxaemia is the total incidence amongst the whole 5,057 primigravidae (8·5 per cent).

(b) *Multigravidae*

(i) Incidence of toxaemia in multigravidae in the pregnancy under observation.

This section includes all those patients who had toxaemia during their 1951 pregnancy. Some of them had a history of toxaemia in a previous pregnancy as well. By adopting this division it is believed that the best estimate of toxaemia in multigravidae is obtained.

TABLE II

	Admissions	Toxaemia	Percentage
Hospital A ..	934	55	5·9
Hospital B ..	1,035	70	6·8
Hospital C ..	1,528	108	7·0
Hospital D ..	2,151	171	7·9
Hospital E ..	821	51	6·2
Total ..	6,469	455	7·0

Thus the overall percentage is 7·0 and the figures for the individual hospitals do not vary materially.

For the same reasons as stated above no multigravida suffering from toxaemia is likely to remain out of hospital so the actual incidence is likely to be 455 in the whole 10,724 multigravidae (4·2 per cent).

(ii) History of toxaemia in a previous pregnancy.

In two hospitals the toxaemic cases among multigravidae were classified according to whether or not they had had toxaemia in a previous pregnancy and the following figures were obtained:

TABLE III

	Admissions	Toxaemia without toxaemic history	Toxaemia with toxaemic history	Total toxaemia in multigravidae
Hospital A	934	39	16	55
Hospital B	1,035	49	21	70

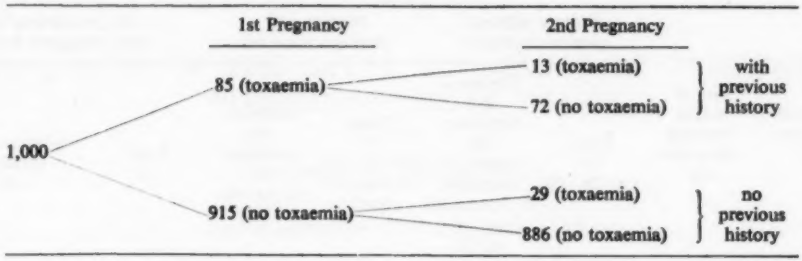
These figures indicate that 37 out of 125 multigravidae (31·2 per cent) who suffered toxaemia in 1951 had also been toxaemic at a previous pregnancy. Even if they had had as many as three previous pregnancies this percentage is higher than the 17 per cent, viz., 8·5+2(4·2), to be expected from the average rates already determined and suggests that the incidence of toxaemia in multigravidae is higher in those with a previous history than in those without.

At the 1951 Census of Great Britain the average number of children who had been born alive to a woman enumerated in the terminal age group 45-49 of the child-bearing period and having at least one child (i.e., parous) was 2·6. Let us suppose that every parous woman has in fact exactly 2 pregnancies. This is a simple hypothesis not too wildly differing from the right order. Then the incidence of toxaemia in primigravidae is 8·5 per cent (from previous data) and in multigravidae is 4·2 per cent and there is an over-riding condition that there must be a history of toxaemia in previous pregnancy in 31·2 per cent of toxaemia cases among the multigravidae.

Table IV represents 1,000 women passing through their child-bearing career.

We can then check these figures since (1) toxaemia incidence at first pregnancy=85/1,000 =8·5 per cent, (2) toxaemia incidence at second pregnancy=(13+29)/1,000=4·2, (3) history of previous toxaemia in those having toxaemia at the second pregnancy=13/42=31·0 per cent. We may also see that in this simple case the multiparous toxaemia incidence of 4·2 per cent is an average of 13/85=15·3 per cent in those with previous toxaemia and 29/915=3·2 per cent in those without previous toxaemia. The overall risk of toxaemia counting only once

TABLE IV



those women who had toxaemia on two occasions is then shown to be 114/1,000=11·4 per cent.

Unfortunately, the true facts are not as simple as this. The number of pregnancies experienced by parous women is not exactly 2 in every case, but varies considerably. It may be deduced from the census figures, to which reference has already been made, that the true variation of parity over the whole child-bearing period is as shown in Table V for 1,000 women entering that age-period (the census distribution which relates to 10,614 women has been rounded and rated to 1,000).

TABLE V

No. of women having at least x pregnancies	
x	No.
1	1,000
2	679
3	381
4	213
5	124
6	75
7	50
8	35
9	20
10	10
11	5
	2,592

Suppose we now estimate that the incidence of toxaemia is 8·5 per cent for primigravidae, 10·0 per cent for multigravidae with previous history of toxaemia and 3·0 per cent for multigravidae without a previous history of toxaemia. The last two figures are guesses based upon the preceding example. We ought also to consider the probability that at any particular pregnancy a proportion of those with toxaemia are for that reason, in addition to all other factors affecting parity, deterred from proceeding to a subsequent pregnancy. However, in order to get the hypothesis in simple terms we have ignored this differential.

We then have the scheme shown in Table VI.

The average proportion of toxaemic multigravidae with a previous history of toxaemia is on this hypothesis 19/[(126−85)+19]=31·7 per cent which is consistent with the data. The total incidence in multigravidae is (126−85+19)/(2,592−1,000)=3·8 per cent, a little lower than the observed 4·2 per cent. On the whole the guessed rates fit the observations fairly well. This and other combinations (marked A, B, C) would yield the results shown in Table VII, the target results being shown at the foot of this table. The best results seem to lie between B and C. Col. (1) is taken from the data but cols. (2) and (3) are arbitrarily chosen to produce a reasonable figure in col. (4).

We may therefore suggest with some confidence that the chance of parous women becoming toxaemic at least once during their child-bearing career is in round figures 13 per cent.

It is possible (and it may be clinically important) that some women are destined to have a higher risk of toxaemia than others *from the very first pregnancy* (and not, as assumed above, at the second or subsequent pregnancy as a result of already having suffered toxaemia) and a self consistent though mathematically more

TABLE VI

Order of pregnancy (1)	No. of women reaching this order (2)	Women without previous toxaemia: Total (3) i.e. (2)−(5)	Women without previous toxaemia: Toxaemia this pregnancy (4) except 1st pregnancy (8·5 per cent) 3 per cent of (3)	Women with previous toxaemia: Total (5) [(4)+(5)−(8) of previous line]	Women with previous toxaemia: Toxaemia this pregnancy (6) 10 per cent of (5)	*Not* proceeding to next pregnancy order: Total (7)	*Not* proceeding to next pregnancy order: With previous toxaemia (8)
1	1,000	1,000	85	—	—	321	85(321/1,000)=27
2	679	621	19	58	6	298	77(298/679)=34
3	381	338	10	43	4	168	53(168/381)=23
4	213	183	5	30	3	89	35(89/213)=15
5	124	104	3	20	2	49	23(49/124)=9
6	75	61	2	14	1	25	16(25/75)=5
7	50	39	1	11	1	15	12(15/50)=4
8	35	27	1	8	1	15	9(15/35)=4
9	20	15	0	5	1	10	5(10/20)=3
10	10	8	0	2	0	5	2(5/10)=1
11	5	4	0	1	0	—	
	2,592		126		19		

TABLE VII

	Combination of percentages: Primiparae (1)	Multigravidae: No previous toxaemia (2)	Multigravidae: Previous toxaemia (3)	All Multigravidae (4)	Rates produced (per cent): Proportion of toxaemia also with previous history (5)	Overall risk (6)
A ..	8·5	3·0	10·0	3·8	31·7	12·6
B ..	8·5	3·0	12·0	4·0	35·9	12·6
C ..	8·5	3·5	10·0	4·2	28·4	13·3
Observed rates	8·5			4·2	31·2	

complicated system can be built up on this hypothesis. The result is still, however, to produce an overall risk of 13 per cent.

We desire to record our thanks to the following who undertook the careful examination of case records in their respective hospitals: B. G. Barrett, A. R. Long, A. H. Rowson, Miss Pauline Sullivan and J. K. Wilson, also to Dr. A. B. Semple, M.O.H. of the City of Liverpool, for details about midwives' cases. Mr. N. H. Carrier of the General Register Office assisted us in the development of the statistical technique used.

REFERENCES

Brews, A. (1953): *Eden and Holland's Manual of Obstetrics*. 10th ed. Churchill. London.

Dieckmann, W. J. (1952): *The Toxemias of Pregnancy*. 2nd ed. Kimpton. London.

Ministry of Health (1949): *Rep. Publ. Hlth. and Med. Subj.*, No. 94. H.M. Stationery Office. London.

Registrar General (1953): *Statistical Review of England and Wales for 1951*. Part II. Civil. Table BB. H.M. Stationery Office. London.

TREATMENT OF THE ACUTE TOXAEMIAS OF PREGNANCY WITH HYPOTENSIVE DRUGS

BY

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IN the majority of the large teaching obstetrical centres in this country and abroad, as well as in many private hospitals, sedation is the chief therapeutic measure available for the control of pre-eclampsia and eclampsia. Following the outstanding results reported by Stroganoff (1923) utilizing morphine and chloral hydrate and Lazard's (1933) success with magnesium sulphate, various combinations of these drugs were utilized to control convulsions and lower blood pressure. Intravenous glucose, usually hypertonic, was added later to secure diuresis. In general, diminishing maternal mortality rates ensued, although the national average mortality rate for eclampsia remains between 10 and 15 per cent. In several teaching clinics the mortality from convulsive eclampsia has approached 4-6 per cent. The Johns Hopkins Hospital reported 11 per cent mortality in 127 cases (1924-1935) treated by a modified Stroganoff routine. In a smaller series of 63 cases treated with magnesium sulphate and sedation between 1935 and 1949, Eastman (1950) reports a rate of 4·9 per cent.

This shift to magnesium sulphate and heavy sedation was not followed unanimously and the Cincinnati General Hospital group continued to use the hypotensive drug "Veratrone", a commercial preparation of the Veratrum Viride alkaloids, without interruption for over 50 years. This method, standardized since 1940, and including magnesium sulphate in moderate dosage in conjunction with Veratrone, was credited with the remarkable low maternal mortality rate of 1·4 per cent in 205 cases of eclampsia (Baird and Assali, 1951). There were 3 deaths in this series but 2 were due to sepsis and occurred weeks after delivery.

Several objections were raised against this regime, the chief one being that Veratrum Viride reduced urinary output. Subsequent investigation showed that this was not valid, the early, transient oliguria being followed by diuresis in all cases wherein overdosage was not a factor (Assali, Kistner and Garber, 1949). Another statement commonly advanced in discussion of this method is that such good results are due to the action of magnesium sulphate rather than to the veratrum alkaloids. Eastman in his text comments on this stating: "as far as I am aware, no one has used only Veratrone in the treatment of eclampsia."

In order to test the action of hypotensive drugs alone it was decided to try the Veratrum compounds in the acute toxaemias without sedation and without magnesium sulphate on the wards of the Kings County Hospital. In 1950, 73·4 per cent of the admissions to the obstetrical service were coloured and 25·4 per cent had had no prenatal care. During the last 17 years, in over 28,000 obstetrical admissions, the incidence of acute toxaemia was 8·2 per cent. In this group there were 15 deaths in 105 eclamptic patients, a maternal mortality rate of 14·3 per cent.

Shortly after the initiation of this clinico-experimental study utilizing Veratrum Viride, a supply of the hypotensive drug, Apresoline, was obtained. Both drugs were incorporated into this analysis and the results form the subject of this paper.

MATERIAL

Seventy-seven patients, including 53 patients with pre-eclampsia, 2 with eclampsia, 15 with essential hypertension with superimposed pre-eclampsia and 7 with essential hypertension comprise the present series. The duration of

pregnancy varied from 22 to 40 weeks. All of the patients were admitted to the hospital, kept at absolute bed rest and placed on a low sodium diet during the entire period of the testing. Of the 53 cases of pre-eclampsia, 33 were severe and 20 were mild. The diagnosis of pre-eclampsia was based on the presence of albuminuria, hypertension, oedema and/or subjective symptoms in the last trimester of pregnancy. The hypertension (140/90) or above was present on separate determinations 24 hours apart in all patients except those with eclampsia whose treatment was instituted immediately. Forty-eight of the 77 patients were given at least one hypotensive drug and 29 received no treatment and served as controls.

Method

Three therapeutic drugs were utilized in this study and the method of administration of each is outlined. In addition 14 patients were tested with tetraethyl ammonium chloride (TEAC), utilizing the method of Assali *et al.* (1950), in an effort to determine the degree of neurogenic and non-neurogenic hypertension present in each subject. It has previously been shown (Assali, 1950; Brust, Assali and Ferris, 1948) that the blood pressure in essential hypertension associated with pregnancy undergoes a significant fall following TEAC administration, whereas toxaemic hypertension is not appreciably affected.

Administration of the various drugs was begun 24 hours after admission without any prior therapy (except in the 2 patients with eclampsia).

A. *Veratrone**: In the treatment of eclampsia and severe pre-eclampsia 0·2 ml. of Veratrone was given intravenously by acute injection and 0·7 ml. was added to a flask of 1,000 ml. 5 per cent glucose in water, the flow being adjusted to run at 60-70 drops per minute, the rate being varied depending upon degrees of hypotension and bradycardia secured. In order to produce adequate hydration 3,000-4,000 ml. of fluid was given intravenously over a 24-hour period. Since the amount of fluid with added Veratrone varied from patient to patient, a double flask was arranged with a Y tube and 5 per cent glucose in water was given during any period that intravenous Veratrone was not necessary. After 24 to 48 hours of intravenous therapy, Veratrone in doses of 0·2 to 0·7 ml. was given subcutaneously every 2 hours to control the blood pressure at approximately 140/90 and the pulse at 80. No magnesium sulphate or other sedatives were given.

Blood pressure and pulse rate were taken every minute for 10 minutes prior to administration of Veratrone, then every minute for 30 minutes after the acute 0·2 ml. dose, then every 5 minutes for 1 hour. After stabilization, blood pressure and pulse were recorded every 30 minutes as long as the intravenous solution was continued.

B. *Verenteral*†: This preparation is a newer, somewhat purified alkaloid of Veratrum Viride, recently standardized and used in the treatment of 35 patients with pre-eclampsia, and 3 eclamptic patients by Baird and Assali (1951). It was employed in this study exactly as described by them, viz., 0·5 to 1 ml. was given rapidly intravenously in 10 ml. of 5 per cent glucose in water and followed by a continuous infusion of 1,000 ml. of 5 per cent glucose in water containing 5 or 10 ml. of Verenteral.

C. *1-Hydrazinophthalazine Methane Sulfonate* (*C-5968* "*Apresoline*")‡: This is one of the newer hypotensive drugs available for clinical research being a potent, long acting preparation which apparently is effective through central blockade of sympathetic outflow in the region of the midbrain. It has been found effective in producing hypotension after unsuccessful thoracodorsal sympathectomy. It has also been shown to cause a constant increase in renal plasma flow (Reubi, 1950). This apparently is brought about through release of vasospasm in the afferent and efferent glomerular arterioles. Apresoline was administered in an acute intravenous dose of 40 mg. Doses of 20-40 mg. were then given every 6-8 hours depending upon the degree of hypotension. Intravenous 5 per cent glucose in water was given in amounts totalling 3,000-4,000 ml. per 24 hours.

* "Improved Veratrone", Parke, Davis and Co., available for clinical investigation in 10 ml. stericapped vials, was utilized in all cases.

† Sterile propylene glycolaqueous tincture of veratrum viride, Irwin Neisler & Co., Decatur, Illinois.

‡ 1-hydrazinophthalazine, Ciba Pharmaceutical Corp., Inc. Summit, New Jersey. Supplied as methane sulfonate in 10 ml. vials (20 mg. per ml.).

Blood pressure recordings and pulse rate were taken every minute for 10 minutes prior to administration, then every minute for 20 minutes after injection, followed by observations every half hour for 5 hours and every hour until blood pressure returned to control level.

D. *Tetra-ethyl ammonium chloride (TEAC)**: This material, used only as a screening agent, was given intravenously in an acute dose of 400 mg. (4 ml.). Testing was usually done at least 30 minutes prior to administration of the therapeutic drug and because of its evanescent effect did not disturb interpretation of later hypotension.

The Analyses

Veratrone: Veratrone was administered to 18 patients with pre-eclampsia and to 2 eclamptic patients. Maximum hypotensive effect after intravenous dosage usually occurred in 4-5 minutes and effective therapeutic levels persisted for 45-120 minutes. Eclamptic patients and seriously ill pre-eclamptics continued to receive intravenous drip therapy and duration of action in these could not be determined. The maximum systolic fall after acute doses averaged 43 mm. Hg and the maximum diastolic fall 29 mm.Hg. The usual side effects of nausea, vomiting and bradycardia were noted in most patients, the latter being easily counteracted with 1/100 grain of atropine given intravenously. The minute volume of urinary output was diminished during periods of extreme hypotension. No serious sequelae, however, were noted from this transient oliguria.

Figure 1 outlines the method of testing utilized in most patients. This patient, admitted during

* Etamon, Parke, Davis and Company, Detroit, Michigan.

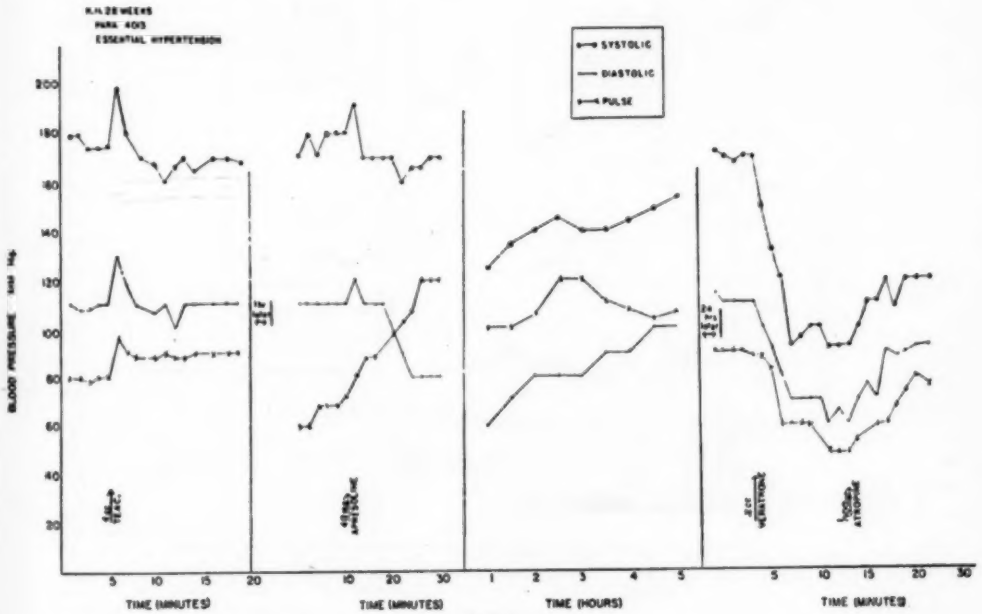

FIG. 1

Graph showing typical testing method with hypotensive drugs. TEAC elicited no vasodepressor response whereas Apresoline caused a marked diastolic drop and tachycardia. Veratrone brought about even more striking hypotensive response with bradycardia.

the 28th week of pregnancy with a diagnosis of essential hypertension (no albuminuria or oedema), showed no hypotensive response to TEAC and was therefore presumed to be toxaemic. Apresoline produced moderate systolic and diastolic hypotension (details described below) whereas Veratrone brought about a marked reduction in blood pressure (90 mm. systolic fall, 55 mm. diastolic fall) with maintenance of a good pulse pressure. Significant hypotensive effect was still present after 30 minutes.

Figure 2 illustrates the effect of an acute intravenous injection of 0·2 ml. of Veratrone in an eclamptic patient; within 40 minutes she was conscious and a history was obtained. Because of difficulty in maintaining intravenous therapy, Apresoline was given as noted in the second part of the graph.

Verenteral: One eclamptic, 6 pre-eclamptic and 3 essential hypertensive patients with super-

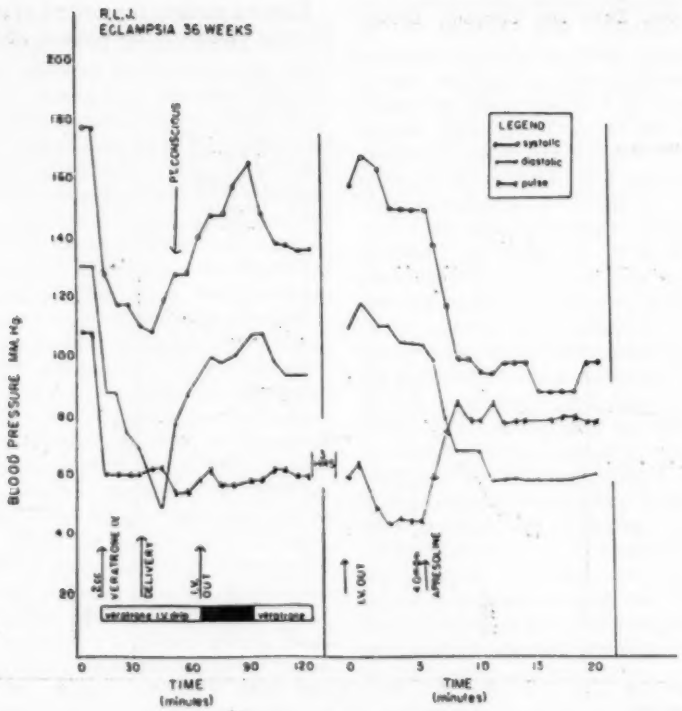

FIG. 2

Eclamptic patient. Veratrone produced marked hypotension in labour. With drug discontinued, hypertension re-established. Apresoline caused similar response but reverted bradycardia of Veratrone to normal.

imposed pre-eclampsia were treated with intravenous Verenteral. The hypotensive effect was similar to that noted with Veratrone, the maximum systolic fall in the 10 patients tested averaging 39 mm.Hg and the maximum diastolic fall averaging 27 mm.Hg. Nausea and vomiting were not significantly diminished. Four patients developed ventricular extrasystoles while on this preparation (proven by electrocardiogram) and pronestyl corrected this arrhythmia in each case.

Figure 3 shows the hypotensive response to 1 ml. of Verenteral followed by continuous intravenous Verenteral in a severe pre-eclamptic patient. After 48 hours of such control the patient was placed on subcutaneous Veratrone, treated for 6 additional days and a Caesarean section performed during the 36th week at the time of optimum control.

Figure 4 shows a similar pattern in a patient with essential hypertension and superimposed

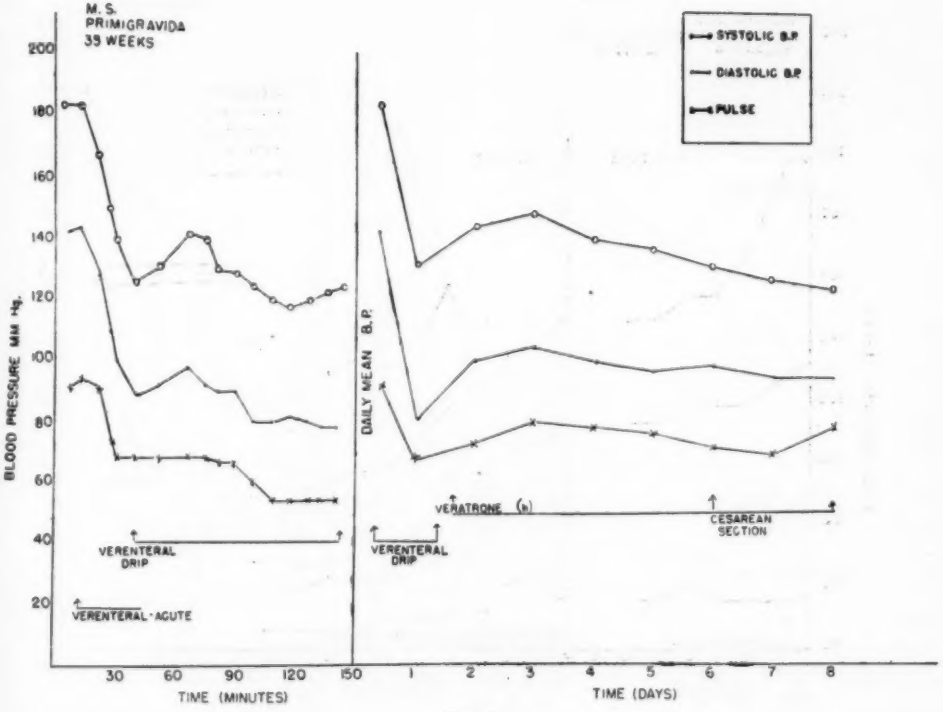

FIG. 3

Showing maintained hypotensive response to continuous intravenous Verenteral administration in a severe pre-eclamptic patient.

pre-eclampsia. It demonstrates the lack of full response in the diastolic component, the lowest being 98 mm.Hg. The release of vagal blockade by atropine is demonstrated.

Figure 5 outlines the treatment in another severe pre-eclamptic patient. The initial hypotension was obtained but, due to marked bradycardia, atropine was given with good effect. The blood pressure became elevated following atropine and during delivery but was well controlled until marked cardiac arrhythmia appeared. Verenteral was discontinued and pronestyl given with a marked hypertensive effect. No further definitive therapy was administered and a gradual diminution in the systolic and diastolic pressures over the next 10 days is evident.

Figure 6 graphically demonstrates the response to Verenteral in an eclamptic patient at 36 weeks. Two convulsions occurred following institution of therapy with the usual systolic rises in pressure.

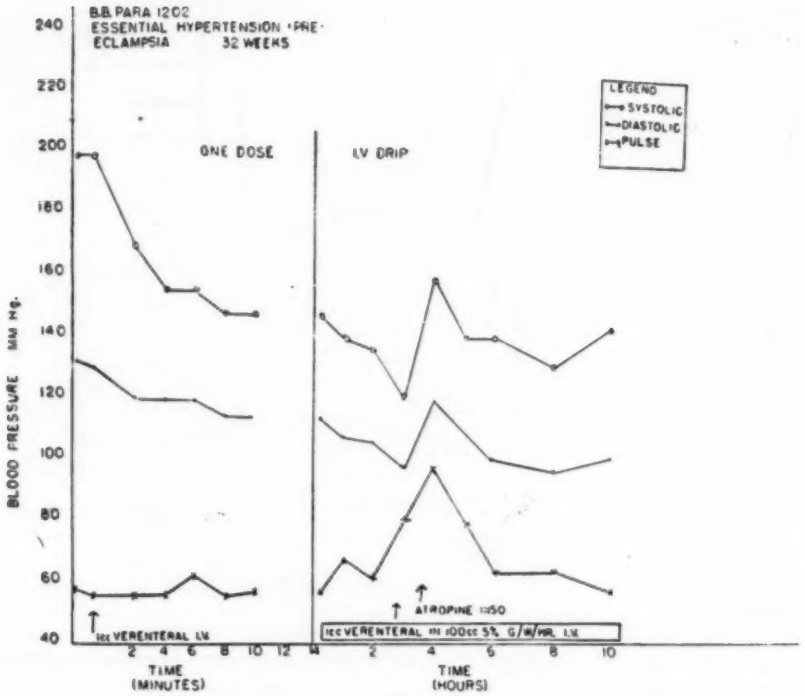

FIG. 4

Demonstrating effect of intravenous Verenteral in a patient with essential hypertension and superimposed severe pre-eclampsia. Bradycardia and hypotension blocked by atropine.

However, the diastolic pressure was well controlled below 100 mm.Hg and an adequate pulse pressure maintained. Because of cardiac arrhythmia, Verenteral was replaced by Veratrone subcutaneously and excellent hypotension was secured over a 7-hour period. In the second portion of the graph it may be noted that Veratrone was continued for 4 days post-partum after which a gradual rise in the daily mean blood pressure occurred.

Apresoline: A total of 20 patients were either tested or treated with this preparation. In all, 57 injections (usually of 40 mg.) were administered, some patients receiving the drug every 6 hours over a period of days. The most severe pre-eclamptic patients were selected for treatment with Apresoline.

One eclamptic patient was treated with a maximum systolic fall of 60 mm.Hg and diastolic fall of 46 mm.Hg. This is the case

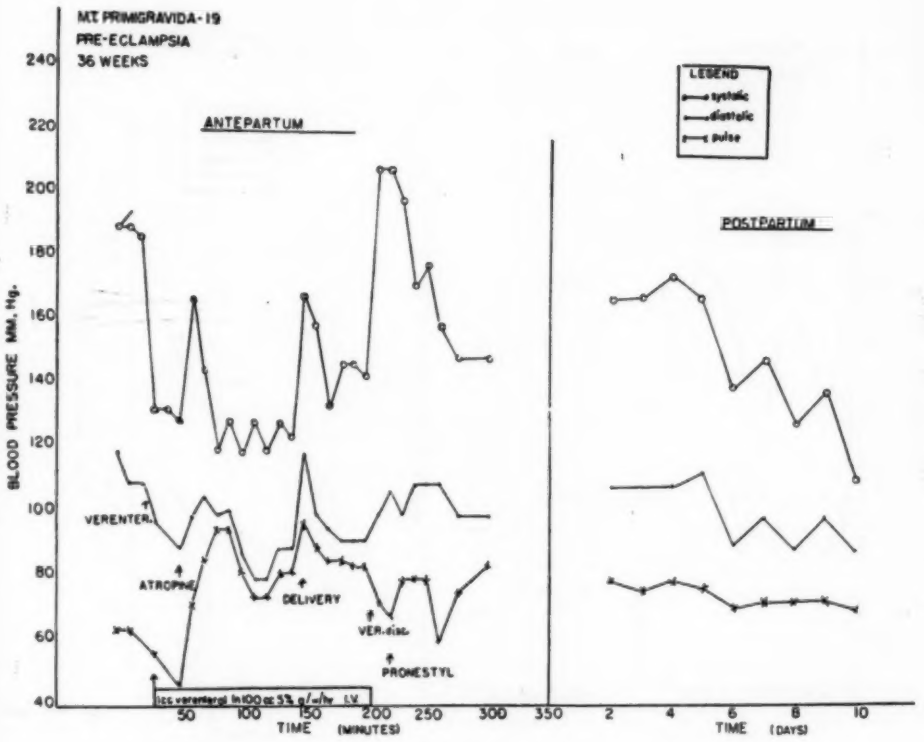

FIG. 5

Graph depicting initial hypotensive effect of Verenteral, block by atropine and temporary release at delivery. Pressure promptly reverted to pre-treatment level when Verenteral discontinued.

previously referred to in Figure 2 and shows the well maintained systolic and diastolic pressures after one 40 mg. dose. The previous Veratrone bradycardia was broken and a pulse rate of approximately 82 resulted.

Figure 7 outlines the marked hypotensive effect of 40 mg. of Apresoline in a patient with severe pre-eclampsia. The usual tachycardia is evident. The diastolic pressure remained below 100 for a period of 4½ hours following injection.

Thirteen severe pre-eclamptic patients whose mean control blood pressure was 174/102 were tested and the maximum systolic fall averaged 64 mm.Hg while the maximum diastolic fall averaged 52 mm.Hg.

Four patients with essential hypertension and superimposed pre-eclampsia whose mean control blood pressure was 192/117 were tested and the average maximum pressure falls were systolic 34 mm. and diastolic 37 mm. Such a case is

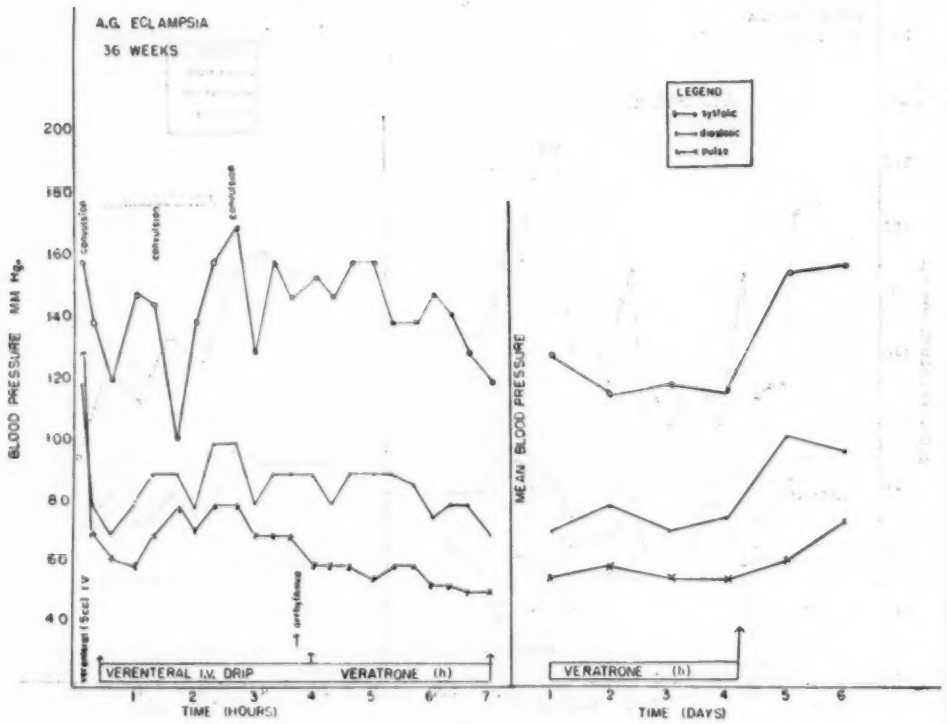

FIG. 6

Intravenous Verenteral treatment of an eclamptic patient. Following arrhythmia treatment initiated with Veratrone and carried for 4 days.

illustrated in Figure 8, showing the preliminary hypotension obtained with TEAC plus the superimposed fall with Apresoline. In all, the systolic pressure was lowered 140 mm.Hg without untoward effect. This synergistic effect of Apresoline with TEAC and hexamethonium has been previously described by Schroeder (1951) and will be commented upon later.

Two patients with uncomplicated essential hypertension were tested and maximum average falls of 23 mm.Hg systolic and 22 mm.Hg diastolic were obtained.

The case previously described in Figure 1 shows a somewhat delayed effect from Apresoline, the maximum systolic and diastolic falls not being obtained until 1 hour after administration. This hypotensive effect persisted for well over 4 hours.

No side effects other than headache (32 per cent) and palpitation (68 per cent) were noted.

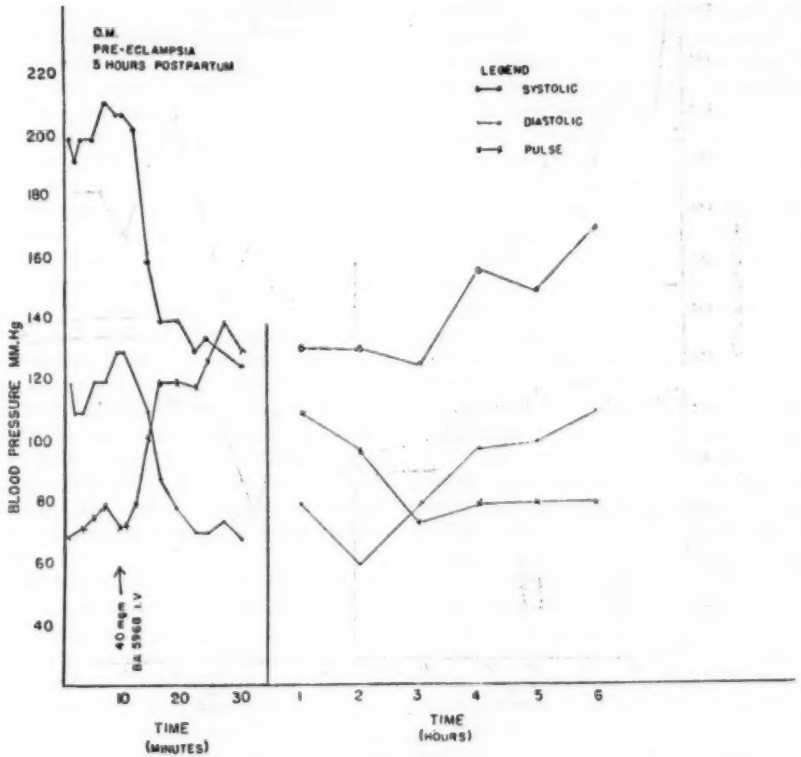

FIG. 7

Graph demonstrating marked hypotensive response in a severe pre-eclamptic patient following 40 mg. of Apresoline intravenously.

Vomiting occurred in only 2 patients. Measurements of total 24-hour urinary output showed no oliguria and in the patients receiving 5 per cent glucose in water intravenously active diuresis occurred. One patient developed oliguria, haematuria and azotaemia while receiving Apresoline but the drug could not be definitely incriminated since it was possible, in spite of negative renal biopsy, that the patient could have had sublethal focal renal cortical necrosis.

Both systolic and diastolic pressures were affected by Apresoline but the diastolic seemed to be more susceptible. A good pulse pressure was always maintained.

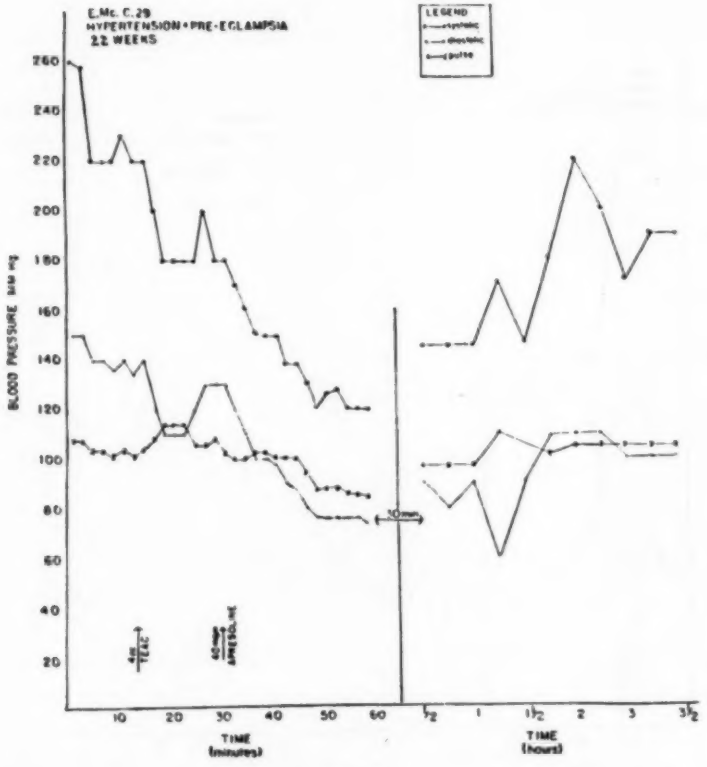

FIG. 8

Graph demonstrating initial hypotensive response to TEAC in an essential hypertensive patient with superimposed toxaemia. Apresoline potentiated hypotensive effect of TEAC, a maximum systolic fall of 140 mm.Hg being obtained without untoward effect.

Discussion

The use of hypotensive drugs rather than sedation in the treatment of pre-eclampsia and eclampsia presupposes that the hypertension associated with this disease is harmful to the patient. This premise is not generally accepted and Willson (1945) has stated that the existing hypertension is actually beneficial for the maintenance of normal kidney function. Dieckmann has believed for many years that pre-eclampsia-eclampsia is due to an abnormal water and electrolyte balance, the increased blood pressure and proteinuria being secondary and/or protective.

An opposing school of thought, exemplified by Hertig and Kellogg (1945), Page and Ogden (1939), Whitacre, Loeb and Chin (1947) and Garber *et al.* (1950), has long held that the predominant physiopathologic process in the acute toxaemias is a generalized vasospasm with subsequent capillary anoxia, tissue ischaemia and necrosis. The hypertension is, therefore, a direct result of increased peripheral resistance (from whatever cause) and, in the absence of a definite method of attack on the primary aetiologic agent, it has seemed plausible to relieve the resultant effect. Evidence is available to substantiate this premise, at least in part, by the administration of TEAC throughout pregnancy. Thus, TEAC produces a progressive lowering of the systolic and diastolic pressures in normotensive, pregnant females beginning about the 16th week and increasing until term. In patients who are developing acute toxaemia, however, such a fall does not occur, indicating the maintenance of blood pressure by a non-neurogenic factor. This variation in vascular reactivity is demonstrable long before changes in water retention or electrolyte imbalance occur (Assali *et al.*, 1952).

The method utilized to reduce blood pressure is of considerable importance and must aim at concomitant release of peripheral resistance. If the approach is limited to a reduction in the numerical gradients of tension alone, the method will not produce the desired effect and may actually be harmful to the patient. Thus, any one of the factors maintaining blood pressure may be altered, e.g., cardiac output, circulating blood volume, blood viscosity, peripheral resistance and elasticity of arteriolar walls.

The ancient method of phlebotomy, unphysiological as it was, reduced the total blood volume with resultant hypotension. This procedure was looked upon with favour by Beck and others at the Long Island College Hospital at one time but has since been discarded.

Sedation in heavy dosage plays a double role, i.e., control of convulsions by central nervous system depression and reduction in blood pressure by lessening peripheral resistance in the case of magnesium sulphate and by direct cardiac effect and vasodilation in the case of barbiturates. Chloral hydrate lowers blood pressure by direct medullary depression and the action of paraldehyde is similar. The findings of McCall, Finch and Taylor (1951) are of interest in analyzing the cerebral physiological responses to sedatives using the Kety-Schmidt nitrous oxide technique. They found a constant increase in the cerebral vascular resistance and a diminution in the cerebral oxygen uptake after sedation. Using the peripheral vasodilator papaverine, however, they found diminished cerebro-vascular resistance and increased oxygen uptake. Cerebral blood flow studies after Veriloid* (veratrum viride) (Wilkins, 1952) have shown changes similar to those found with papaverine.

Reduction of hypertension in the acute toxaemias by regional anaesthesia has been advocated by Hingson (1949) and others. Theoretically, segmental blockade of the sympathetic outflow either intra- or peri-durally reduces vasoconstriction in vessels made so by sympathetic overactivity. It was further presumed that such blockade would dilate constricted renal arterioles and increase urinary output. Such findings, however, are not constant. In fact, studies of renal physiology during osmotic diuresis in the hydropenic pregnant patient after high selective spinal anaesthesia revealed not only a marked reduction in urine flow, renal plasma flow and glomerular filtration rate following hypotension, but also an actual increase in renal resistance. In addition there was associated reduction in the excretion of sodium and chloride (Assali *et al.*, 1951). The blood pressure may fall in certain cases, especially when

* Veriloid—preparation of Veratrum Viride—Riker Laboratories Inc.

there is a basic essential hypertension. However, it has been well established that such hypotension results from pooling of blood in the extremities associated with dilatation of capillaries, venules and veins. This is due, in part, to muscular paralysis and release of vein-supporting structures. This may be demonstrated merely by lifting both legs and allowing such pooled blood to re-enter the circulation. Assali and Prystowsky (1950) have shown by ballistocardiographic studies that such a "medical phlebotomy" results in a diminished venous return, lessened cardiac filling and reduction of cardiac output. The pulse pressure is likewise diminished. Associated studies using 0·2 per cent procaine intrathecally to produce selective paralysis of pin prick sensation and autonomic fibres to levels of C-4 failed to reveal significant hypotension in patients with pure toxaemia, indicating that such hypertension was not maintained by sympathetic overactivity. Patients with essential hypertension, however, showed marked blood pressure reduction with dilute procaine. Hingson has reported a maternal mortality rate of 3·9 per cent in 74 eclamptic patients treated by conduction anaesthesia.

Turner, DeLozier and Whitacre (1952) have recently revived interest in therapy aimed at correction of excessive blood viscosity, namely, the hydration treatment and cite 50 cases of eclampsia with a mortality rate of 4 per cent. Mengert, Jennett and Brown (1949) had previously cautioned against fluid overload and described 6 deaths due to "water intoxication". Certainly the amount of intravenous fluid to be given will depend upon the total urinary output and, when drugs are utilized which do not diminish total output, fluids up to 3,000 ml. may be given daily without hazard.

In the utilization of the Veratrum and hydrazine compounds, tools have been made available for the release of the peripheral arteriolar spasm. The exact physiological processes involved are not known but both substances are extremely effective in so-called "non-neurogenic" hypertension. In this study tetraethylammonium chloride was used to differentiate neurogenic (essential) from non-neurogenic (toxaemic) hypertension. This drug, by producing a pharmacological blockade of the autonomic ganglia, causes a reduction in arteriolar tone (Lyons *et al.*, 1948) and probably venomotor tone (Brust *et al.*, 1948) without affecting cardiac output. It thereby reduces blood pressure in patients where such elevation is mediated by excessive neurogenic impulses. In toxaemia hypertension, however, the excess tension is maintained by another (? humoral) mechanism and TEAC is without appreciable effect.

The vasodilation of the Veratrum compounds has been said to be of a reflex nature with the afferent paths located in the vagus nerves (Krayer, Wood and Montes, 1943; Moe, Bassett and Krayer, 1944; Dawes, 1947). Depressor responses after Veratrum administration have not been abolished by artificial respiration, vagal section or atropine (Moe *et al.*, 1944; Cramer, 1915). Freis *et al.* (1949) have shown that the drug does not significantly affect cardiac output in man. These facts suggest that arteriolar resistance is diminished after administration of the drug. Freis *et al.* (1949) have suggested that the vaso-depressor action of Veratrum is due to stimulation of vaso-dilator fibres although complete evidence in this regard is not available.

The results obtained in this study with Veratrone and Verenteral tend to substantiate the findings of previous investigators.

Apresoline, by virtue of its dual capacity of reducing blood pressure and yet increasing blood flow through the kidney, has opened a new avenue of approach both for the study of the mechanism of hypertension in toxaemia and for its treatment.

Extensive clinical and laboratory investigations (Freis and Finnerty, 1950; Grimson, Chittum and Metcalf, 1950), have demonstrated its action to be largely central, involving no sedative component, resulting in lowering of systolic and diastolic pressures in both neurogenic and non-neurogenic hypertension.

The chief site of action seems to be the midbrain producing a blockade of excessive sympathetic vasopressor impulses. Taylor, Page and Corcoran (1951) have demonstrated a pressor substance in dogs brought about by centripetal stimulation of the vagus and believe this substance to be of cerebral origin. Apresoline may act by inhibiting such a cerebral vasopressor substance. The drug exerts also a moderate

degree of adrenergic blocking effect against the pressor effects of epinephrine and nor-epinephrine and has an inhibitory influence against the pressor actions of angiotonin, serotonin and pherentasin. In pregnant individuals, however, both with and without toxaemia, the pressor effect of epinephrine is not depressed by Apresoline and occasionally results in an actual increase (Assali *et al.*, 1952).

Apresoline offers certain pharmacological and physiological advantages not found with drugs previously employed in toxaemia therapy. Its marked effect on the diastolic pressure and the implication thereof is of extreme importance in view of recent work by Mukherjee and Govan (1950) on the significance of diastolic hypertension in the acute toxaemias. In rabbits this drug produces an increase in coronary blood flow (Gross, Druey and Meier, 1950). Studies in man (Reubi, 1950; Schmid and Reubi, 1950; Page and McCubbin, 1951) show a constant increase in renal blood flow and recent observations (Assali and Baird, 1952) in toxaemia of pregnancy have demonstrated dilatation in both afferent and efferent glomerular arterioles. However, work in progress in this clinic seems to indicate that there is a transient fall in urinary output concomitant with the fall in blood pressure. Whether this is of clinical significance is, at present, unknown. Much more study needs to be carried out in this regard. Despite contradictory evidence, it now seems well established that afferent glomerular arteriolar vasoconstriction does exist in pre-eclampsia and eclampsia. Hafkenschiel *et al.* (1952) have shown a significant relaxation of cerebral vascular tone during the hypotensive phase after Apresoline hypertensive patients. Assali *et al.* (1952) studied 20 cases of hypertensive pregnancy and reported dramatic results. Normal blood pressure levels, in some cases, were maintained for as long as 25 hours following a single injection. Cardiac output was unchanged or increased.

If the results so far obtained are valid, it would seem that Apresoline has simplified the treatment of toxaemia. In pre-eclampsia adequate hypotension may be obtained without the excessive nausea and vomiting of the Veratrum compounds. It is simple to give by single shot technique and needs no elaborate apparatus such as is necessary for continuous spinal or caudal. It obviates the extremes of central nervous system and respiratory depression seen with magnesium sulphate, barbiturates, morphine, and chloral hydrate together with their resultant foetal effects. Physiological studies indicate increased blood flow to organs generally believed to be ischaemic in this disease. Combination therapy with tetraethylammonium chloride, hexamethonium and the newer Veratrum compounds has suggested that even more beneficial results may be obtained. No serious toxic effects in pregnant patients have to date been attributed to the drug.

This has been a pilot study and certainly no statistical data may be derived from the figures listed herein. Investigation is being continued with the drugs mentioned together with newer, more potent ganglionic blocking agents and this will be the subject of a future report.

Summary and Conclusions

(1) Thirty-seven patients with pre-eclampsia, 2 eclamptic patients, 7 patients with essential hypertension and superimposed pre-eclampsia, and 2 patients with essential hypertension alone were treated with one or more hypotensive drug. No sedation was given.

(2) Veratrone, Verenteral and Apresoline were utilized separately and in conjunction with each other. Tetraethylammonium chloride was employed for determination of the type of hypertension present.

(3) Veratrone in acute toxaemia produced a constant hypotension, bradycardia and was usually associated with nausea and vomiting. Temporary diminution in urinary output was noted during the period of maximum hypotension. Verenteral produced similar results but was associated in 4 cases with ventricular extrasystoles.

(4) Apresoline, in acute toxaemia, produced a marked hypotension and tachycardia. Headaches occurred in 32 per cent. Urinary output was not suppressed. Subjective and objective clinical improvement occurred routinely following administration.

(5) The hypotensive drugs, used without sedation, offer a physiological mechanism for the

release of the vasospasm associated with the acute toxaemias.

(6) While these drugs are not as yet recommended as complete treatment for the acute toxaemias of pregnancy, they offer definite promise and are worthy of extensive pharmacological and clinical investigation.

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References

Assali, N. S., and Baird, W. W. (1952): *Proc. Nat. Meeting Amer. Fed. clin. Res.* (May).

Assali, N. S., Brust, A. A., Garber, S. T., and Ferris, E. B. (1950): *J. clin. Invest.*, **29**, 290.

Assali, N. S., Kaplan, S. A., Formon, S. J., Douglass, R. A., and Tada, Y. (1951): *J. clin. Invest.*, **30**, 916.

Assali, N. S., Kistner, R. W., and Garber, S. T. (1949): *Amer. J. Obstet. Gynec.*, **58**, 90.

Assali, N. S., and Prystowsky, H. (1950): *J. clin. Invest.*, **29**, 1354, 1367.

Assali, N. S., Vergon, J. M., Tada, Y., and Garber, S. T. (1952): *Amer. J. Obstet. Gynec.*, **63**, 978.

Baird, W. W., and Assali, N. S. (1951): *Amer. J. Obstet. Gynec.*, **62**, 1093.

Brust, A. A., Assali, N. S., and Ferris, E. B. (1948): *J. clin. Invest.*, **27**, 717.

Cramer, W. (1915): *J. Pharmacol.*, **7**, 63.

Dawes, G. S. (1947): *J. Pharmacol.*, **89**, 325.

Eastman, N. J. (1950): *William's Obstetrics.* 10th ed. Appleton-Century. New York. pp. 689, 693.

Freis, E. D., and Finnerty, F. A. (1950): *Proc. Soc. exp. Biol., N.Y.*, **75**, 23.

Freis, E. D., Stanton, J. R., Culbertson, J. W., Litter, J., Halperin, M. H., Burnett, C. H., and Wilkins, R. W. (1949): *J. clin. Invest.*, **28**, 353.

Garber, S. T., Assali, N. S., Kistner, R. W., and Prystowsky, H. (1950): *Amer. J. Obstet. Gynec.*, **60**, 315.

Grimson, K. S., Chittum, J. R., and Metcalf, B. H. (1950): *Fed. Proc.*, **9**, 279.

Gross, F., Druey, J., and Meier, R. (1950): *Experientia*, **6**, 19.

Hafkenschiel, J. H., Friedland, C. K., Yobaggy, J., and Crumpton, C. W. (1952): *Proc. Nat. Meeting Amer. Fed. clin. Res.* (May).

Hertig, A. T., and Kellogg, F. S. (1945): *Clinics*, **4**, 585.

Hingson, R. A. (1949): *Obstet. gynec. Surv.*, **4**, 352.

Krayer, O., Wood, E. H., and Montes, G. (1943): *J. Pharmacol.*, **79**, 215.

Lazard, E. M. (1933): *Amer. J. Obstet. Gynec.*, **26**, 647.

Lyons, R. H., Hoobler, S. W., Neligh, R. B., Moe, G. K., and Peet, M. M. (1948): *J. Amer. med. Ass.*, **136**, 608.

McCall, M. L., Finch, T. V., and Taylor, H. W. (1951): *Amer. J. Obstet. Gynec.*, **61**, 393.

Mengert, W. F., Jennett, R. J., and Brown, W. W. (1949): *Amer. J. Obstet. Gynec.*, **57**, 97.

Moe, G. K., Bassett, D. L., and Krayer, O. (1944): *J. Pharmacol.*, **80**, 272.

Mukherjee, C. L., and Govan, A. D. T. (1950): *J. Obstet. Gynaec. Brit. Emp.*, **57**, 941.

Page, E. W., and Ogden, E. (1939): *Amer. J. Obstet. Gynec.*, **38**, 230.

Page, I. H., and McCubbin, J. (1951): Unpublished observations quoted by Taylor *et al.*

Reubi, F. (1950): *Proc. Soc. exp. Biol., N.Y.*, **73**, 102.

Schmid, A., and Reubi, F. (1950): *Helv. med. Acta.*, **17**, 543.

Schroeder, H. A. (1951): *Proc. centr. Soc. clin. Res.*, Nov. 23 and personal communication to the Ciba Pharmaceutical Co.

Stroganoff, V. (1923): *J. Obstet. Gynaec. Brit. Emp.*, **30**, 1.

Stroganoff, V., and Davidovitch, O. (1937): *J. Obstet. Gynaec. Brit. Emp.*, **44**, 289.

Taylor, R. D., Page, I. H., and Corcoran, A. C. (1951): *Arch. intern. Med.*, **88**, 1.

Turner, H. B., DeLozier, O., and Whitacre, F. E. (1952): *J. Amer. med. Ass.*, **148**, 979.

Whitacre, F. E., Hingson, R. A., and Turner, H. B. (1949): *Obstet. gynec. Surv.*, **4**, 350.

Whitacre, F. E., Loeb, W. N., jr., and Chin, H. (1947): *J. Amer. med. Ass.*, **133**, 445.

Wilkins, R. W. (1952): Personal communication.

Willson, J. R. (1945): *Amer. J. Obstet. Gynec.*, **49**, 665.

A SIMPLE DEVICE FOR OXYGEN THERAPY OF INFANTS, PARTICULARLY IN ASPHYXIA NEONATORUM

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In his latest work, *Researches on Prenatal Life*, Sir Joseph Barcroft discusses his earlier observations on asphyxia in newborn foetal lambs. In foetal lambs, which did not breathe even after ligation of the umbilical cord and thus were undoubtedly asphyxiated, Barcroft utilized his findings on the significance of the afferent nerve impulses as stimuli for the central mechanism of respiration. In this connexion, he points out particularly the impulses from the region of the trigeminal nerve. It is from this region that peripheral stimuli first release respiratory movements in foetal lambs. In order to satisfy the requirements of oxygen in the asphyxiated foetus and to produce simultaneously an intense stimulation of the region of the trigeminal nerve, Barcroft employed a stream of oxygen directed via a rubber tube towards the regions of the nose and mouth. The stream of oxygen ("stream not trickle") ought to be as powerful as possible without producing injury. In this way, as large a part as possible of the region of the trigeminal nerve is stimulated. If respiratory movements are hereby released the oxygen content in the inspired air rises. The procedure is preceded by clearing the upper respiratory passages of their contents. By this method Barcroft occasionally achieved "dramatic success".

As far as I have been able to ascertain, this simple method of treating asphyxia, based on physiological principles, has not yet been recognized in the clinical sphere. In any case, I have not found any publication concerning it. Both stimulation of the skin in various ways and the administration of oxygen play a great part in the treatment of asphyxia. The administration of oxygen is carried out, as a rule, with a mask or in an oxygen chamber, although the efficacy of this procedure is naturally slight or non-existent if complete apnoea is present. Peripheral stimuli consist most frequently of slapping or contrast baths. Both of these methods are, at any rate in the more severe forms of asphyxia and in premature infants, undoubtedly risky procedures. For technical reasons, an effective increase in the oxygen content of the inspired air is seldom or never achieved while employing these methods which, in my opinion, are old-fashioned but still remarkably popular.

For two years the following device has been tried in the labour wards in Gothenburg and in the attached wards for the treatment of premature infants. A funnel of glass or plastic, the dimensions of which appear in Fig. 1, is employed. In the shaft of the funnel, a somewhat stiff rubber tube with an internal diameter of approximately 3 mm. is introduced. This tube must completely fill the cavity in the shaft of the funnel, but must at the same time be movable so that the position of its distal free end is adjustable. The funnel is placed so that its inferior edge encircles the infant's chin. The distal end of the rubber tube should be situated so that it is directed towards the infant's upper lip, approximately midway between the mouth and the nose at a distance of 0·5-2 cm. Oxygen which has first passed through a Woulfe's bottle is led through a rubber tube to the funnel. With a flow of 3-4 litres per minute such a strong jet of oxygen is, as a rule, obtained that phenomena of stimulation in the form of respiratory movements and/or defensive movements are produced. Under control, much greater rates of flow may be employed if response does not occur.

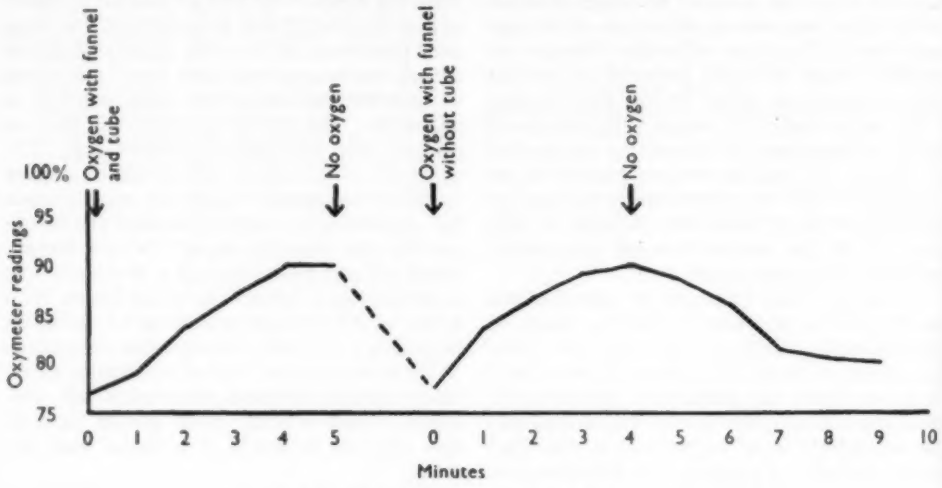
This technique has been tried under many different circumstances but most frequently in asphyxia neonatorum. It seems also to be of

greatest value in attacks of apnoea in premature infants. It may be employed both for infants in ordinary cots or in incubators, i.e., the Aga incubator and the so-called Isolett. With regard to the risk of retrolental fibroplasia, which a too high or too varied content of oxygen may entail, funnel stimulation is employed only for short periods in the case of apnoea or cyanosis. If these are prolonged, it is wise to have only air in the incubator and to control the content of oxygen obtained by prolonged or repeated employment of the funnel. In the majority of cases, however, so far as premature infants in incubators are concerned, quite short " oxygen jets" suffice. The nurses in charge of premature infants have found the method simple and frequently effective. The technique has also been employed in asphyxia neonatorum. Where this is slight, progress is, naturally, to be anticipated whatever method is employed. The present method entails simultaneous administration of oxygen and adequate skin stimulation, as we have pointed out, and must therefore be regarded as superior to the ordinary methods recommended in slight asphyxia.

The method has also been employed in combination with the technique of gastro-intestinal administration of oxygen in asphyxia worked out in Gothenburg (Åkerrén and Fürstenberg, 1950). When respiration commences during and after severe asphyxia it appears rational that the oxygen content of the inspired air be as high as possible. The cerebral respiratory centres, paralysed in severe asphyxia, begin to recover when fairly effective respiratory movements appear. Adequate peripheral stimuli must, in this connexion, be regarded as valuable. In every case of asphyxia and more particularly in severe cases, it is desirable that the condition be overcome as rapidly as possible and by as simple and innocuous means as possible. Both the gastro-intestinal administration of oxygen and the technique described here* appear to satisfy these requirements.

The efficacy of the method has been tested with an oxymeter in an infant suffering from

* KIFA, Instrument Manufacturers, Stockholm, supply the apparatus for the treatment of asphyxia described by Åkerrén & Fürstenberg. In this apparatus is included an outfit for gastro-intestinal administration of oxygen as well as the device described in detail here. By means of a connecting tap, the stream of oxygen may be quickly and simply turned from the one mode of administration to the other.



♂ 0, born 20.11.51. Oxymeter test 20.11.51

FIG. 2

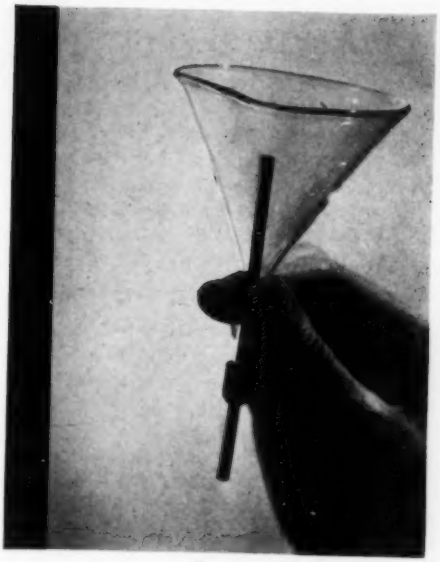


FIG. 1

cyanosis in connexion with pulmonary atelectasis. The result as regards the oxygen saturation of the blood appears from Fig. 2, which also for comparison shows the effect of the administration of oxygen with a funnel without the blowing tube. Quite rapid increase in the oxygen saturation was observed in both procedures. This newborn infant as well as another one, examined in the same way and suffering from cyanosis and atelectasis, showed normal respiration and in its general condition was satisfactory. The experiments were performed to demonstrate that the oxygen content of the blood may be increased by employing the technique recommended here. The other and perhaps the more important effect, the stimulating effect upon respiration, did not appear as the infants breathed satisfactorily. Unfortunately, I have not any experiments on apnoea in newborn infants at my disposal.

The method has also been tried in some cases of severe affections of the respiratory tract, as a rule in the form of capillary bronchitis, and in two cases of severe diarrhoea with coma and a tendency to cessation of respiration or highly inadequate respiration. In all cases, small infants were concerned. In this way it has been possible, *inter alia*, to produce more efficient and deeper respiration and improvement of the skin colour. As regards the observations made by Barcroft on the particular sensitivity to peripheral stimuli of the region of the trigeminal nerve, the following clinical observations may be of interest. In comatose infants, i.e., infants who do not respond to painful stimuli, an excitability is almost invariably maintained in the trigeminal region. If one blows, e.g., with the mouth, or more hygienically directs a stream of oxygen or air towards the face, movements of the eyelids or possibly other movements of the facial musculature are almost invariably observed. Personally, I noticed this many years ago. Feer (1931) mentions the observation in his textbook on paediatric diagnosis. It is perhaps justifiable to propose the term "trigeminal blowing reflexes" for these reflex-like responses which are preserved even in deep unconsciousness and where the afferent impulses arise in the trigeminal region.

Summary

The author describes a device, based upon the theoretical and practical observations of Barcroft. A narrow rubber tube is employed, which lies firmly within the shaft of a funnel (glass or plastic). The dimensions of the funnel are such that it acts as a sort of mask. A powerful stream of oxygen is directed through the rubber tube towards the infant's upper lip. In this way, stimulation of the region of the trigeminal nerve, which may exert a stimulatory effect on the respiratory centre, as well as increase in the oxygen content of the inspired air, are achieved. The method is valuable in cases of slight asphyxia in the newborn and in attacks of cyanosis and apnoea in premature infants. The method may also be employed in combination with the gastro-intestinal administration of oxygen, particularly at the stage when spontaneous respiratory movements begin to appear or after the establishment of a depot of oxygen in the stomach and intestine.

References

Åkerrén, Y., and Fürstenberg, N. (1950): *J. Obstet. Gynaec. Brit. Emp.*, **57**, 705.

Barcroft, J. (1946): *Researches on prenatal life*. Blackwell, Oxford.

Feer, E. (1931): *Diagnostik der Kinderkrankheiten*. Springer, Berlin.

AN EXPERIMENTAL STUDY OF THE PENETRATION OF HUMAN CERVICAL MUCUS BY SPERMATOZOA *IN VITRO*

BY

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VARIATIONS in the penetrability of cervical mucus to spermatozoa have been studied by several workers, including Lamar, Shettles and Delfs (1940), Séguy and Simmonet (1933), Pommerenke and Viergiver (1946, 1947), and Abarbanel (1946). All these have been primarily interested in the quality of the mucus, and its changes during the menstrual cycle or as the result of hormone therapy. The main object of the present series of experiments was to determine how far the quality of the semen used affected the penetration of mucus. It was also hoped to determine how far conception following artificial insemination could be predicted from the result of a penetration test.

1. MATERIAL

In all 751 samples of cervical mucus have been tested, and 551 semen specimens were used. The mucus was obtained from 104 women who were receiving artificial insemination either with husband or donor semen. The semen was produced by 163 different donors. Each mucus was tested with the semen used for insemination, and also, where the quantity of mucus was sufficient, against another semen specimen. In addition to the insemination donors, semen specimens sent to the laboratory for analysis were used. A total of 1,035 tests have been done.

2. METHODS

The mucus was obtained by the method described by Jackson (1948). For transport to the laboratory it was placed on a glass slide, covered with a coverslip, and stored on damp filter paper in a petri dish. The test was performed between ½ and 2½ hours after collection.

The slide used for the penetration tests has been described by Harvey and Jackson (1948). It is illustrated in Fig. 1. The mucus is spread over the area between A and B, and the semen drop placed at A. Two or more tests were done with one mucus sample only if sufficient material was available to cover at least 2 cm. on each of the slides used. Only one examination was made, after one hour's incubation, as it was found that little or no improvement in penetration occurred after this time, and the sperm in the semen drop rapidly lost their motility. In some cases, where invasion after one hour was very poor, a drop from a second semen specimen was placed at the other end of the mucus (B on the diagram), and the slide was incubated for a further hour and re-examined.

No attempt was made to use objective methods for assessing the physical properties of the mucus. It was seldom possible to fulfil the requirements of Clift's menstroscope method (1945) such as the use of dry instruments, freedom from contamination with blood, and examination within 20 minutes of collection. Moreover, the quantity of mucus was too small to allow for loss on the surface of instruments used in estimating viscosity. Even in determining the length of the thread which could be drawn out between two slides (*spinbarkeit*) so much

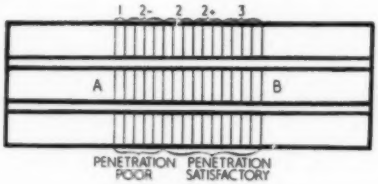

FIG. 1

Diagram of slide used in penetration tests, and method of scoring the results.

variation occurred in tests with the same mucus sample that measurements were no more reliable than qualitative estimates.

The fluidity of the mucus was described as runny, fairly runny, rather tacky or tacky, according to the ease with which it could be spread over the test slide. Its general appearance was scored as clear, more clear than cloudy, part clear part cloudy, more cloudy than clear, or cloudy, according to the predominance of translucent or of opalescent or opaque material. Comparison of the impression of two people making independent decisions showed that in most cases there was close agreement between their descriptions.

When the mucus was examined under the microscope at the end of the test, note was made of large blocks or strands of pus cells or of squames, and of the presence of excessive numbers of Döderlein bacilli. Scattered cells and bacilli were not noted, as even in the clearest mucus it is possible to find some cells in an intensive search.

The density, motility and morphology of the semen used was assessed by the usual methods used in this laboratory (Harvey and Jackson, 1945). In a few cases the morphology of the sperm of regular A.I. donors was not examined.

The method of scoring the result of the penetration test has been modified slightly from that given in the original description of the slide, and is shown in Fig. 1. For most purposes a division of the results into those showing no penetration, poor penetration (less than 1 cm.) and satisfactory penetration (2 cm. and over) has been the most convenient, as it avoided subdivision of the tests into very small groups, and also made it possible to include mucus samples covering less than the whole length of the slide. For comparison of pairs of tests with the same mucus or the same semen, the results have been regarded as different if the distance penetrated differed by two grades of the numerical scoring. Thus 2− is not regarded as better than 1 or less good than 2, but 2 is better than 1, and less good than 3, but not less good than 2+. Complete failure to enter the mucus is regarded as less good than any degree of penetration, even if the invading sperm travel less than 2 mm. within the mucus.

As soon as the semen drop has been brought into contact with the mucus on the test slide, the junction of semen and mucus is examined under the lower power (2/3 obj.). It is usually possible to determine at once whether invasion occurs. In a number of cases, after incubation, mucus containing sperm has been removed to an ordinary slide, covered, and examined with a higher power. It has been found that even when the sperm are so few that more than 10 fields must be examined with a 1/6 obj. to discover one sperm in a thin layer of mucus, they are easily detected on the penetration slide with the lower power. It is therefore unnecessary to check the absence of sperm under higher magnification.

3. General Observations

The passage of spermatozoa from semen to mucus is marked by an alteration in the pattern of movement of the tail. In good quality mucus the rate of forward movement is not appreciably altered, but the rate of beat of the flagellum is less rapid, the sperm often appearing to glide through the mucus between one beat and the next. The flicking of the head produced by alternating side and surface views is absent, although occasional turning is seen. In more viscous mucus, the sperm are slowed up and the tail oscillates in wider and wider arcs, often with no forward movement of the head. In such cases the tail may become wound in a spiral or folded back upon itself, while the head moves sluggishly from side to side.

Sperm which progress freely when they first enter the mucus may be slowed down or completely arrested after travelling a greater or less distance. This is sometimes due to variations in the consistency of the mucus, but frequently forwardly progressing sperm may be seen to pass close to those that have become stationary. This suggests that the momentum or energy reserve of the sperm differs, and the driving power of some may be exhausted before that of others. The result of this is a steady depletion of the sperm population as the distance from the semen-mucus junction increases. In only three tests has the concentration of sperm at B on the slide not been markedly less than at A.

If a drop of buffered glucose solution is placed

in contact with the mucus at B, sperm reaching this end of the mucus pass freely into the solution. An attempt was made to estimate the proportion of sperm passing through 3 cm. of mucus by using 0·02 ml. of semen at A, and the same volume of buffered glucose at B. After the ordinary period of incubation the fluid at B was removed to a counting slide. In the majority of cases so few sperm were present that no accurate estimate could be made, only one or two sperm being found in 80 squares on the counting slide. In one of the three excellent tests referred to above, there were 1 million progressing sperm in the semen drop, and 0·003 million in the buffered glucose after one hour's incubation. It follows that even with the most receptive mucus, of the available motile sperm in the ejaculate, less than 1 in 100, and in most cases less than 1 in 1,000, actually pass through the mucus barrier of the cervical canal.

In many tests in which no sperm reach the end of the mucus, the first 2 to 4 mm. of the mucus adjacent to the semen may contain numerous sperm. Table I shows the rate of arrest of the sperm in three typical tests.

Large plaques of squames and dense masses of pus cells form a barrier to sperm progress. Not only do sperm not pass through them, but the presence of such cell aggregates seems to alter the physical condition of the mucus surrounding the mass. The sperm seem to have no avoidance reaction to such obstacles, although when these are small the oscillation and rotation of the arrested sperm may cause it to reverse its direction, or may swing it into a region where progress is possible. Sperm can often be seen passing along narrow channels between strands of cells, on the surface of which many other sperm are performing non-progressive movements.

When a dense and active semen is in contact with a mucus which resists invasion, although the movements of the sperm within the drop are random, those which reach the mucus-semen interface remain with their heads directed towards the mucus, their tails oscillating in the semen. Exactly the same result is obtained if a solution of agar or tragacanth too viscous for the sperm to penetrate is substituted for the mucus. In a very few cases the sperm at the interface are immobilized by the end of the incubation period, but this appears to be associated with the contamination of the mucus with vaginal material.

4. The Effect of Mucus Quality on Penetration

As the mucus was obtained, with a very few exceptions, on the day selected for artificial insemination, it may all be regarded as mid-cycle mucus. In many cases, however, it did not resemble either in quantity or quality the ovulatory mucus of fertile women as described by Clift (1945). This was partly due to the difficulty in fixing the date of ovulation and partly to sub-fertility factors in the women.

Tables II and III show the proportion of the different types of mucus described in section 2, and their relation to the result of the tests. Twelve specimens which consisted of thin watery fluid mixing freely with semen have not been included.

Excessive numbers of squames and pus cells caused a significant reduction in the number of satisfactory penetrations, but not of initial invasions. Numerous Döderlein bacilli on the

Table I

The reduction in number of sperm found in successive divisions of the Test Slide

Mucus		Sperm per low power field at given distance from semen mucus interface							
Appearance	Viscosity	Test Result	2 mm.	4 mm.	6 mm.	8 mm.	10 mm.	12 mm.	14 mm.
Cloudy	Tacky	2	+	+	24	6	1·5	0	0
Cloudy	Fairly runny	2–	+	10	5	0·3	0	0	–
Part clear, part cloudy	Runny	2	+	+	15	1·5	4	0·5	0

other hand reduced the proportion of specimens invaded, but did not affect the distance penetrated in cases where invasion took place. This agrees with the impression from direct observation of the behaviour of the sperm that the effect of the cells is mechanical. The bacilli on the other hand probably indicate a lower pH than in uncontaminated mucus. Although the quantity of material available made it impossible to determine the pH of the mucus used in the test, unpublished work on post-coital mucus has shown that mucus with many Döderlein bacilli frequently has a pH between 6·5 and 7·0, whereas clear runny mucus usually has a pH of 7·4 to 7·6. Better buffering in some mucus specimens would account for the good penetrations obtained in spite of the presence of bacilli.

As a result of the analysis of the tests on the basis of mucus quantity and quality, the mucus samples were divided into two groups, good and poor. Poor mucus shows one or more of the following characters: 1, insufficient in quantity to cover one test slide; 2, tacky; 3, in appearance cloudy or more cloudy than clear; 4, containing excess numbers of Döderlein bacilli or cells.

5. The Effect of Semen Quality on Penetration

The results of the penetration tests were analyzed in relation to four characteristics of the semen: (1) Density of spermatozoa, (2) density of progressively motile spermatozoa, (3) density of morphologically normal spermatozoa, and (4) the fertility index of the semen.

The values 1, 2 and 3 are direct observations. The fertility index is a figure calculated from the density, percentage of progressing sperm, and percentage of morphologically normal cells. Though based on objective data it is a qualitative assessment of the semen, and is based on the probability of conception (Harvey, 1953).

The results of plotting normal sperm against penetration are not included here, as there was less correlation than was shown either with

Table II

Penetration and the Viscosity of Mucus

Description of Mucus	Cases	Penetration					
		None		Poor		Satisfactory	
		No.	Per cent	No.	Per cent	No.	Per cent
Runny	568	50	8·8	213	15·2	305	53·7
Fairly runny	147	27	18·37	81	55·1	39	26·53
Rather tacky	151	23	15·23	86	56·95	42	27·82
Tacky	146	57	39·04	79	54·11	10	6·85
Total	1,012	157	15·5	459	45·4	396	39·1

Table III

Penetration and the Translucence of the Mucus

Description of Mucus	Cases	Penetration					
		None		Poor		Satisfactory	
		No.	Per cent	No.	Per cent	No.	Per cent
Clear	404	23	5·7	160	39·6	221	54·7
More clear than cloudy	134	19	14·2	68	50·75	47	35·07
Part clear, part cloudy	107	16	14·95	45	42·05	46	42·99
More cloudy than clear	147	32	21·77	70	47·52	45	30·61
Cloudy	209	61	29·19	114	54·55	34	16·26

density or motility, both of which characters are of course closely correlated with morphology in human semen. Figs. 2 to 4 illustrate the relation found between penetration and the other three factors.

Considering first the initial invasion of the mucus by sperm, it will be seen that the proportion of mucus samples penetrated is unaffected by the density if this exceeds 20 million per ml., or by the number of motile sperm if this is greater than 1 million/ml. By the χ^2 test of significance none of the other points on the curves differ significantly from the mean. The fertility index gives a closer correlation with invasion, the proportion of failures falling steadily as the index increases up to 50, and, if only the good mucus is considered, up to 70.

The greater discrimination of the fertility index as a measure of the ability of the sperm to invade mucus is probably related to the fact that, while taking account of motility and density, it also contains a factor derived from the morphology. Many abnormal sperm show progressive motion but it is seldom as rapid or as direct as that of normal sperm. If the chances of a sperm entering a given mucus specimen depend on its momentum and its angle of impact at the surface of the mucus, normal sperm will enter more frequently than abnormal ones in proportion to the

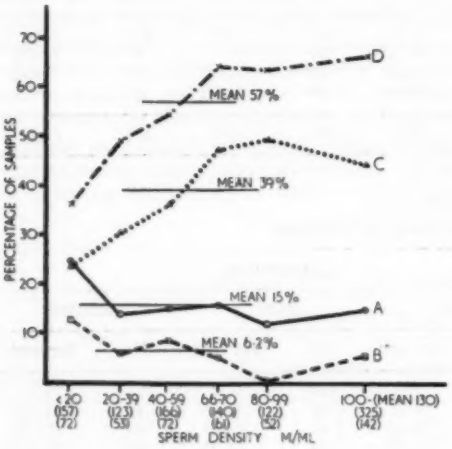

FIG. 2

The relation between sperm density and penetration.

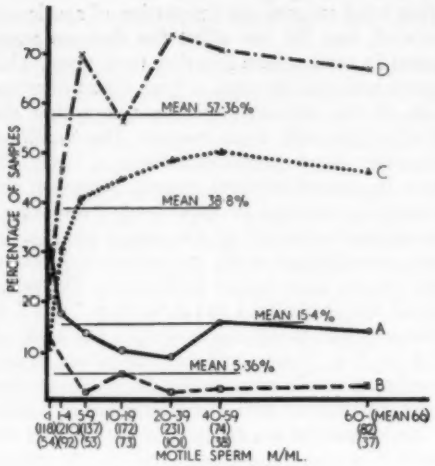

FIG. 3

The relation between the number of progressing sperm and penetration.

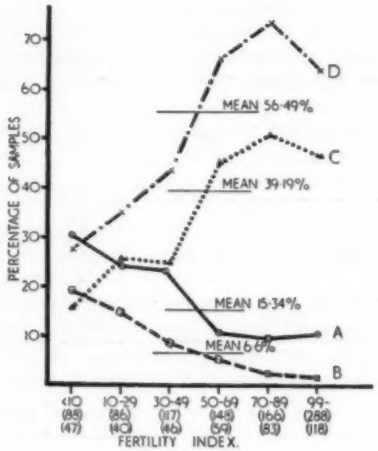

FIG. 4

The relation between the Fertility Index of the semen and penetration.

FIGS. 2-4

A. No penetration.
B. No penetration, good mucus only.
C. Satisfactory penetration.
D. Satisfactory penetration, good mucus only.

Figures in brackets indicate the number of tests in each group, the smaller number in each case being for good mucus only.

numbers of each type present in the semen. This view is supported by the observation that very few sperm with abnormal heads are found in post-coital mucus even when the husband's semen is known to contain a high proportion of such forms.

If the majority of the sperm which are able to enter the mucus are morphologically normal, the distance through which they are able to progress in the mucus should be unaffected by the morphology of the semen from which they have come, and the fertility index should give no closer correlation with distance penetrated than the other characters. This is found to be the case, the shape of the three curves giving the proportion of satisfactory penetrations being the same whether this is plotted against density, number of motile sperm or fertility index. A maximum proportion of satisfactory penetrations is obtained with sperm densities above 60 million per ml., motile sperm more than 20 million per ml. and a fertility index of 70 or more. It follows from the weeding out process described in section 3 that the more numerous the sperm entering the mucus at A, the greater the chance that some will reach and pass the 1 cm. line.

6. The Effect of Diluting Semen with Buffered Glucose on the Penetrating Power of the Spermatozoa

It is the rule in agricultural practice to dilute bull semen required for insemination with suitable diluents. This has the double advantage that the volume is increased, and also diluted semen retains its fertilizing power in store longer than undiluted semen. The viability of human spermatozoa is also much improved if the semen is diluted with buffered glucose, and the addition of an equal volume of diluent to freshly liquefied semen is an advantage where the semen used for A.I.H. has to be brought a long distance, or produced before the husband leaves for work in the morning.

In spite of the obvious advantages of dilution, it seemed desirable to discover whether it had any deleterious effect on the penetration of mucus. Kurzrok and Miller (1928) and Moench (1934) have suggested that human seminal plasma has a lytic action on cervical mucus which facilitates the entry of the sperm. It is also possible that the sperm may itself carry an enzyme capable of altering the mucus through which it passes. Such an enzyme might be removed from the sperm head in the same way as hyaluronidase has been shown to be removed by dilution (Swyer, 1947, 1948).

Seventy-five tests have been done in which a given semen, and a dilution of that semen with buffered glucose, has been tested with fractions of the same mucus specimen. The mucus to be used was rubbed vigorously between coverslip and slide to render it homogeneous, and macroscopic aggregates of opaque material were removed if sufficiently large and few or divided as evenly as possible between the two sections. Mucus can be manipulated and divided quite easily by using the edges of ordinary square coverslips. The mucus was divided between two test slides, on one of which was placed a drop of the semen, and on the other a drop of the dilution. The test was carried out as usual and the results are summarized in Table IV.

Table IV

The Effect of Dilution with Buffered Glucose on Penetration

Dilution	Tests	Result same with dilution as semen	Penetration by semen only	Penetration by dilution only	Penetration better with semen	Penetration better with dilution	Motile sperm <5 m./ml. in dilution
1 in 2 ..	16	8	—	—	5	2	1
1 in 10 ..	5	2	—	1	2	—	5
1 in 20 ..	43	18	3	1	19	2	39
1 in 40 ..	12	6	—	—	5	1	12
Total ..	75	34	3	2	31	5	57

In 33 tests there was no difference in the result between diluted and undiluted semen. In those cases where only one slide showed invasion, in 3 cases the successful sperm came from the undiluted and in 2 from the diluted semen. In 57 cases (76 per cent) the density of progressing sperm in the dilution was reduced to less than 5 mil./ml., and on the basis of the results shown in Fig. 3 greater differences between the results with diluted and undiluted semen would have been expected. The sperm in a high dilution of a good semen are of course of better quality then those found in semen with a similar count without dilution. Moreover, the diluting fluid undoubtedly improves the quality of motion of the sperm, and so improves the chances of sperm entering the mucus.

These tests indicate that lytic action by seminal plasma is not a necessary factor in the penetration of cervical mucus, nor, with dilutions of the order used here, do the sperm lose any substance required for their passage through the mucus. This is in agreement with the findings of Pommerenke and Viergiver (1947b) on penetration of mucus by washed spermatozoa.

7. Variation in the Penetration of a Given Mucus by Sperm from Different Donors

Mucus samples were divided, as in section 6, between two or more test slides, and each fraction was tested with semen from a different donor. The quality of the semen was assessed on the number of motile sperm present, and the specimens were not regarded as being different in this respect unless the number of motile sperm in one exceeded that in the other by 20 mil./ml. except where the number in the poor semen was less than 20 mil./ml. The second specimen was then regarded as better if it contained twice as many motile sperm as the poorer one. In the 358 tests the semen differed in 283 tests (79·7 per cent) and was similar in 72 (20·3 per cent).

In 213 tests the two semen samples showed no difference in the degree of penetration. The semen specimens in these differed in 169 cases (79·3 per cent), and were similar in 44 (19·7 per cent). This is exactly what would be expected in a random sample, and shows that the quality of the mucus in these cases completely obliterated any effect of the difference in quality of the semen.

In 142 cases the result showed different penetration by sperm from different semen specimens. In 52 cases only one slide showed invasion. In 44 of these (84·6 per cent) the better semen was the successful one, in the remaining 8 (15·4 per cent) the two semen samples were similar.

In 90 tests penetration occurred on both slides, but sperm from one semen proceeded further in the mucus than those from the other. Better penetration was obtained with better semen in 70 cases (77·8 per cent), with semen of similar quality in 4 cases (3·3 per cent), and with the poorer semen in 16 cases (18·9 per cent). In all of these 16 anomalous tests the mucus was not homogeneous, being described as "part clear, part cloudy", or "more clear than cloudy". In several cases tests had been done on other occasions with mucus and semen from the same patient and donor, and good penetration had been obtained. There is in fact no evidence for any antagonism between a given donor's sperm and the mucus of any particular woman.

It is clear from these results that in most cases the character of the mucus is the limiting factor in determining the success of the penetration test. Where, however, differences do occur in the degree of penetration of a given mucus sample, better semen may be expected to enter better and travel further than semen of poorer quality.

8. Differences in the Penetrating Power of Semen from Individual Donors

To investigate possible individual idiosyncrasies in the behaviour of the sperm of different donors, the results of tests with the semen of 22 different donors were examined in detail. The semen of each of these men had been used for not less than 10 separate tests. The donors were arranged according to their mean fertility indices into three groups—under 30, 30-69, and 70 or higher. The mucus samples tested with each donor's semen were classed as poor or good, as described in section 4. From the results summarized in Fig. 4 the expected number of tests giving no invasion, poor penetration or satisfactory penetration were calculated. Table V shows the observed and calculated results.

TABLE V

Observed and Calculated Results of Penetration Tests with 22 Donors
(The calculated figure is given in brackets)

Fertility Index	Donor	Tests	Mucus		Penetration			
			Poor	Good	None	Poor	Satisfactory	
70 or more	1	27	6	21	0 (1·4)	9 (9·5)	18 (16·1)	
	2	49	16	33	2 (3·4)	28 (18·2)	19 (27·5)	Pos. sig.
	3	68	23	45	0 (4·7)	29 (25·4)	39 (37·9)	
	4	113	45	68	2 (8·9)	42 (43·6)	67 (60·5)	
	5	14	5	9	2 (1)	4 (5·3)	8 (7·7)	
	6	14	5	9	2 (1)	4 (5·3)	8 (7·7)	
	7	17	5	12	4 (1)	13 (6·1)	0 (9·9)	Sig.
	8	22	9	13	1 (1·8)	6 (8·6)	15 (11·6)	
	9	23	5	18	2 (1·2)	11 (8·1)	10 (13·7)	
	10	23	9	14	2 (1·8)	9 (8·9)	12 (12·3)	
	11	11	5	7	1 (1·05)	4 (4·65)	7 (6·3)	
30–69	12	59	17	42	0 (6·6)	34 (24·7)	25 (27·7)	Sig.
	13	96	36	60	5 (12)	52 (41·9)	39 (42·1)	
	14	13	6	7	5 (1·8)	4 (5·9)	4 (5·3)	
	15	10	4	6	3 (1·3)	7 (4·4)	0 (4·3)	Pos. sig.
	16	21	11	10	3 (2·9)	11 (10·2)	7 (7·9)	
	17	14	5	9	0 (2·6)	6 (5·9)	8 (6·5)	
Less than 30 ..	18	12	4	8	4 (2·9)	6 (6·1)	2 (3·0)	
	19	11	5	6	5 (2·9)	5 (5·6)	1 (2·4)	
	20	11	7	4	4 (3·4)	5 (5·7)	2 (1·9)	
	21	13	7	6	3 (3·7)	10 (6·7)	0 (2·6)	
	22	25	11	14	7 (6·6)	12 (11·0)	6 (5·4)	

In all but 4 cases there is no significant difference between the observed and expected results. The deficiency in cases 2 and 15, though possibly significant ($P<0·05$ but $>0·01$) could easily have arisen from the difficulty of accurately assessing the mucus, the poor mucus in these tests possibly containing more very bad samples than usual. Both these men have several children. Case 7 appears to be a genuine case of a man whose sperm penetrate less well than the results of semen analysis would lead one to expect ($P<0·01$). A possible explanation of

this is that the average speed of the sperm is less than in most semens. This would be a very difficult thing to measure. It is of interest, however, that the spermatozoa of donor 12, who has a significantly higher success rate in the tests than expected, move extremely well, though the percentage of sperm motile is usually rather low. Donor 7 has produced no pregnancies, while the wife of donor 12 eventually conceived after 8 years of intermittent treatment including long periods of artificial insemination.

9. The Penetration Test and Likelihood of Conception

In a very large number of cases the mucus of a patient receiving artificial insemination has given an excellent result with the semen of the donor used, but the patient has not conceived. In 22 cases conception followed insemination on the day the test was done. The results are shown in Table VI. These tests contained no more satisfactory results than would be expected in a random sample of all the tests done. The penetration test therefore gives no indication of the likelihood of conception following insemination.

Table VI

The results of Penetration Tests Associated with Conception following Insemination

	Penetration			Total
	None	Poor	Satisfactory	
Results ..	1	7	14	22
Expected	3·3	10·1	8·6	22

The quality of the 22 mucus samples is shown in Table VII. It is obvious that ovulation must have occurred in 7 of these women when the cervical mucus presented considerable obstruction to the passage of sperm, and it is possible that the success of the insemination resulted from the fact that the sperm were deposited high in the cervical canal instead of in the vagina.

Table VIII shows the quality of the successful semen specimens. In 5 cases the semen used had been diluted, a further proof that the sperm are not injured by this process.

While in a larger series of successes occasional conceptions would undoubtedly occur when the semen was below the minimum standard of this group, it would seem that the chances of success are reduced when the density is below 20 mil./ml., and the number of motile sperm below 5 mil./ml. Artificial insemination with husband's semen is not likely to give results where the quality of the semen is very poor, but where it is relatively good and the wife's mucus persistently unsatisfactory there is a fair chance of success.

10. Variations in the Penetration Test in Relation to the Dates of the Previous and Subsequent Menstrual Period

The date for insemination is chosen by reference to the average length of the patient's menstrual cycle, and to the basal temperature chart. In most cases the date of onset of menstruation preceding and following the penetration test were known, and it seemed of interest to see how far the proportion of satisfactory tests was related to these two events.

Fig. 5 shows the result of plotting the proportion of satisfactory penetrations against days

Table VII

Character of Mucus Associated with Successful Insemination

Viscosity	Translucence					Total
	Clear	More clear than cloudy	Part clear part cloudy	More cloudy than clear	Cloudy	
Runny ..	11	1	3	1	—	16
Fairly runny ..	1	—	—	—	2	3
Tacky	—	2	—	1	—	3
Total ..	12	3	3	2	2	22

TABLE VIII

The Character of the Semen Associated with Successful Insemination

Density		No. of Motile Sperm		Fertility Index	
Mil./ml.	No. of specimens	Mil./ml.	No. of specimens		No. of specimens
Less than 20 ..	—	Less than 5	—	Less than 30	—
20–29	1	6	3	30–39	1
30–39	1	7	2	40–49	3
40–49	3	8	1	50–59	2
50–59	3	10–19	4	60–69	2
60–69	1	20–29	3	70–70+	14
70–79	4	30–39	6		
80–89	1	40–49	1		
90–99	—	50–59	1		
100–100+ ..	8	60–69	1		

In 5 cases the semen was diluted for use in insemination, and in these cases the figures given are for the dilution.

after and before menstruation. It must be borne in mind that these data differ from similar observations on fertile women, such as those by Pommerenke and Viergiver (1947a), in that many of the women included in this series were sub-fertile, and at no time produced a typical ovulatory mucus.

It will be seen that the satisfactory results are spread evenly between the 9th and 20th day after menstruation, but a significant peak occurs at the 15th to 16th day before the next period. This is in agreement with the generally accepted view that the length of the follicular phase is more subject to variation than that of the luteal phase. Only 38 per cent of the tests were done on the two days giving a maximum of satisfactory results.

The inseminations which were followed by conception were done on days ranging from the 10th to the 17th after the previous period.

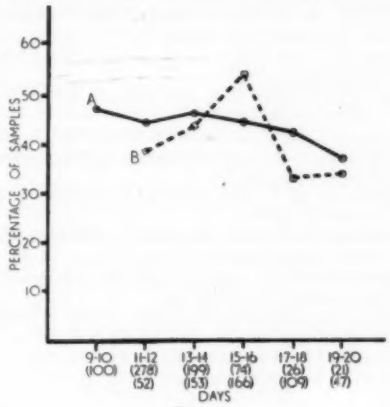

FIG. 5

The proportion of satisfactory penetrations in relation to days after and before the onset of menstruation.

A. Days after.
B. Days before.

The figures in brackets indicate the number of tests in each group, the upper one referring to curve A and the lower to curve B.

11. DISCUSSION

The observations made *in vitro* on the penetration of mucus are of great importance in the interpretation of post-coital tests. It has been clearly demonstrated that spermatozoa may enter and progress through a good mucus even when the semen specimens from which they come are definitely sub-fertile. On the experimental slide a very small quantity of semen has a very short surface in contact with a much larger volume of mucus. In coitus the volume of mucus will usually be less than that of the semen, and the surface presented by the mucus stream will be bathed in seminal fluid. As only progressively motile sperm enter the mucus, the result will be a concentration of the motile sperm from the semen in the smaller volume of mucus. This will be particularly the case when,

as not infrequently happens, the mucus in the upper part of the canal is less fluid than that in the lower part, as sperm entering the mucus at the lower end will be trapped in the lower cervical canal. The removal of the mucus from the canal and the preparation of the slide for examination inevitably obliterates any stratification of the mucus, but often the sperm present are confined to small areas or strands, indicating that *in vivo*, as in the test, the mucus is far from homogeneous.

It follows from these considerations that for the proper evaluation of a post-coital test the mucus must be removed in two fractions, one from the lower and one from the upper part of the canal. The test may only be regarded as satisfactory if the movement of the sperm is at least as good in the upper as in the lower fraction. Even in cases fulfilling this requirement large numbers of sperm, of the order of 5-10 per high power field, must be present and moving in the upper cervical mucus before it can be assumed, in the absence of a semen analysis, that the husband's semen is fully fertile. Conversely, in view of the dominating effect of the mucus quality on penetration, no semen can be judged as sub-fertile on post-coital observations alone.

The author would like to acknowledge her indebtedness to Dr. Margaret Jackson, for her co-operation in obtaining the mucus samples, and supplying the relevant clinical data. Thanks are also due to Dr. Stewart Smith for his interest and encouragement, and to the South West Regional Hospital Board for financial assistance.

12. Summary

(1) A method is described for studying the penetration of cervical mucus by sperm *in vitro*.

(2) In passing through a short strip of mucus the sperm population is very greatly reduced.

(3) The quality of the mucus is much more important than that of the semen in determining penetration, but some relationship between semen quality and penetration is demonstrated.

(4) Dilution of semen does not adversely affect the power of sperm to penetrate mucus.

(5) No indication of antagonism between good mucus and good semen has been found.

(6) The characteristics of the mucus and semen in 22 cases of successful insemination are analyzed.

(7) The maximum proportion of good penetration is found 15 to 16 days before the start of the next period.

(8) The bearing of observations made *in vitro* on the interpretation of post-coital tests is discussed.

References

Abarbanel, A. R. (1946): *in* Engle, E. T. (ed.): *The problem of fertility*. Princeton University Press, New Jersey.

Clift, A. F. (1945): *Proc. R. Soc. Med.*, **39**, 1.

Harvey, C. (1953): *J. clin. Path.*, **6**, 232.

Harvey, C., and Jackson, M. H. (1945): *Lancet*, **2**, 99, 134.

Harvey, C., and Jackson, M. H. (1948): *Lancet*, **2**, 723.

Jackson, M. H., Malleson, J., Stallworthy, J., and Walker, K. (1948): *Problems of fertility in general practice*. Hamilton, London.

Kurzrok, R., and Miller, E. G., jr. (1928): *Amer. J. Obstet. Gynec.*, **15**, 56.

Lamar, J. K., Shettles, L. B., and Delfs, E. (1940): *Amer. J. Physiol.*, **129**, 234.

Moench, G. L. (1934): *J. Lab. clin. Med.*, **19**, 358.

Pommerenke, W. T., and Viergiver, E. (1946a): *Amer. J. Obstet. Gynec.*, **51**, 192.

Pommerenke, W. T., and Viergiver, E. (1946b): *J. clin. Endocrinol.*, **6**, 99.

Pommerenke, W. T., and Viergiver, E. (1947a): *Amer. J. Obstet. Gynec.*, **54**, 676.

Pommerenke, W. T., and Viergiver, E. (1947b): *Proc. Soc. exp. Biol., N.Y.*, **66**, 161.

Séguy, J., and Simonnet, H. (1933): *Gynéc. et Obstét.*, **28**, 657.

Swyer, G. I. M. (1947): *Biochem. J.*, **41**, 409, 413.

Swyer, G. I. M. (1948): *Biochem. J.*, **42**, 28, 32.

RENAL FUNCTION AND CHLORIDE METABOLISM IN PRE-ECLAMPTIC TOXAEMIA

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THERE is now an impressive literature dealing with the relationship of salt retention to the oedema of pre-eclamptic toxaemia. Chesley (1944) has shown that the retention of salt runs almost parallel with that of water during normal pregnancy, and Chesley and Chesley (1941, 1943) have shown that oedema is one of the earliest signs of pre-eclamptic toxaemia. Taylor, Warner and Welch (1939) have reported that there is a marked retention of salt in pre-eclamptic toxaemia. Similarly Strauss (1935) and Dieckmann *et al.* (1951, 1952) have reported that the administration of salt increases the severity of toxaemic symptoms, and, in contrast, Dieckmann (1952) has found that as the oedema subsides the salt balance becomes negative.

There are several possible interpretations of these findings. Salt retention may be a primary factor of fundamental importance in pre-eclamptic toxaemia. On the other hand it may be secondary to renal dysfunction. A further possibility has been suggested by Mukherjee and Govan (1950): the retention may be related to an upset in tissue carbohydrate metabolism. With these possibilities in mind it was decided to try and determine the influence of renal function on the retention of salt in pre-eclamptic toxaemia.

METHODS AND MATERIALS

A modification of the short salt-load test described by Soffer *et al.* (1944) was performed on 17 patients in the following way. No fluids were allowed from 7 p.m. the previous night. At 7 a.m. the bladder was emptied and this urine was discarded. The urine was then collected from 7 a.m. to 10 a.m. and labelled specimen 1. A sample of blood was withdrawn at 9.30 a.m. After emptying the bladder at 10 a.m. 200 ml. of 5 per cent sodium chloride was given intravenously as quickly as possible by a two-way syringe. Thereafter urine was collected at hourly intervals until 1 p.m.—3 specimens in all. Samples of blood were withdrawn at 10.30 a.m., 11.30 a.m. and 12.30 p.m. The chlorides in these specimens were estimated according to the method of King (1951).

This test was carried out on 15 pregnant patients and 2 normal non-pregnant women of child-bearing age. Eight of the pregnant patients were suffering from pre-eclamptic toxaemia of fairly severe degree with diastolic pressures 105 and over, gross oedema and albuminuria. Three patients were known to be suffering from chronic renal insufficiency with high blood pressure, albumen and casts in the urine, and a poor urea concentration. Four normal patients in the later months of pregnancy were used as controls.

RESULTS

As can be seen from Table I the hourly urine volume during the control period is diminished

TABLE I

Urinary Volumes (hourly)

(ml.)

	Pre-injection	1	2	3	3-hourly total (ml.)
Normals ..	41	68	62	53	183
Pre-eclamptic toxaemia ..	31	41	32	34	107
Chronic nephritis	50	269	135	96	500
Non-pregnant ..	52	119	79	59	257

in toxaemia. Following administration of sodium chloride there is a diuresis with its peak during the first hour in all groups. The diuresis is most marked in chronic renal disease and, even allowing for a continued standard output of 50 ml. per hour as in the pre-injection period, the volume excreted in the first hour exceeds the total given by injection. From the figures in the end column it can be seen that, even in normal pregnancy, the total amount of water administered is not excreted in the 3 hour post-injection period. This is in contrast to the non-pregnant subject who excretes more than the total in the 3-hour period. With toxaemia the power of the pregnant individual to eliminate water is further diminished, but in the presence of chronic renal disease the reverse happens and the volume of urine passed greatly exceeds the amount given.

Pregnancy *per se* makes little difference to the fasting concentration of chloride (Table II).

TABLE II

Urinary Chloride Concentrations
(hourly ml.)

	Pre-injection	1	2	3
Normals	1,067	1,151	1,269	1,194
Pre-eclamptic toxaemia ..	478	769	774	632
Chronic nephritis	678	780	928	823
Non-pregnant ..	994	1,116	1,392	1,456

Both pre-eclampsia and chronic nephritis diminish the fasting level. Following administration of salt the concentration of chloride in the urine increases in all groups. In pregnant patients the highest concentration is reached in the second hour of the post-injection period, and thereafter the level declines. Once more the values for normal patients are well above those suffering from toxaemia or chronic renal disease. The urinary concentration of chloride in the non-pregnant individual continues to rise throughout the whole period of observation.

The total amounts of chloride eliminated per hour also show distinct characteristics (Table III). Prior to the giving of salt the values for the four groups form a gradient with the non-pregnant patients excreting the highest quantity.

TABLE III

Total Chloride (hourly)
(mg.)

	Pre-injection	1	2	3
Normals	450	796	767	719
Pre-eclamptic toxaemia ..	155	392	245	268
Chronic nephritis	333	2,066	1,192	748
Non-pregnant ..	528	1,377	1,105	865

Pregnancy diminishes the total excreted and when complicated by toxaemia or chronic nephritis the amounts are greatly reduced. Following administration of salt all show an increased output of chloride, but pregnant patients only eliminate approximately two-thirds of the amount excreted by non-pregnant patients. The curve of excretion, however, is similar, with the maximum output during the first hour (Fig. 1). A similar excretion curve is shown by the chronic nephritic group, but in this instance the amount of chloride is very large. With toxaemia the amount of chloride eliminated is much reduced, being less than half of that excreted by normal pregnant patients. The curve of excretion shows its main peak in the first hour, but there is a second slight rise in the third hour (Fig. 2).

Of the 10 grammes of sodium chloride injected the chloride ion accounts for 6 grammes. Thus far the values have all been expressed in terms of sodium chloride. If they are expressed as chlorine (Table IV) some interesting statistical facts are brought to light. Following the administration of 6 grammes of chlorine in the form of sodium chloride the normal pregnant patient

TABLE IV

3-hourly Chlorine Totals

	Pre-injection mg.	Post-injection mg.	Excess Excreted mg.	Percentage of injection
Normals	819	1,385	566	9·0
Pre-eclamptic toxaemia ..	279	549	270	4·5
Chronic nephritis	607	2,431	1,824	30·0
Non-pregnant ..	950	2,008	1,058	17·5

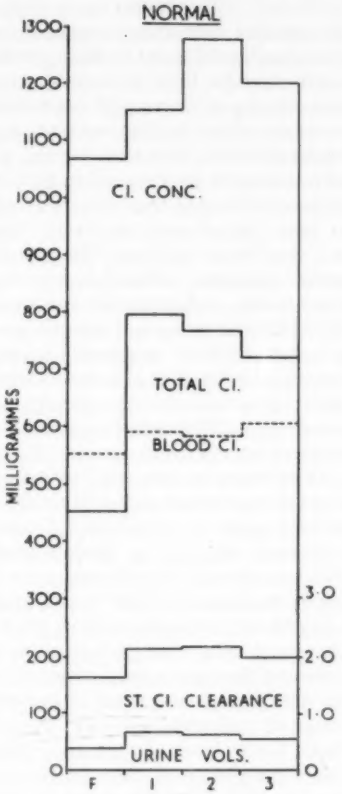

FIG. 1

Excretion curves before and after salt administration in normal pregnant patients.

is only able to eliminate 1·4 g. in 3 hours, that is 23 per cent. Prior to the giving of salt, however, she excretes 0·8 grammes of chlorine in 3 hours and, if the same amount of "endogenous" chlorine is eliminated in the period after the injection, then only 0·6 grammes or 9 per cent of the injected chlorine is passed in the urine. In the case of the non-pregnant patient almost twice this amount, 17·5 per cent is excreted. With toxaemia complicating pregnancy the figure sinks to 4·5 per cent, but in a nephritic patient the proportion is raised to 30 per cent.

These values may be expressed as a single figure in the form of a blood clearance. In this case the standard formula for urea clearance was employed. By this method it can be seen that there is a distinct difference between the blood clearance of chlorides in pre-eclamptic toxaemia and nephritis, with the highest clearances occurring in chronic nephritis and the lowest in toxaemia (Table V).

A comparison of these various values (Figs. 1, 2 and 3) shows that the total amount of chloride excreted appears to run parallel with the volume of urine in all cases. The curve of the urinary chloride concentration is much the same in all groups, and, in the normal patients, both pregnant and non-pregnant, the curve of the

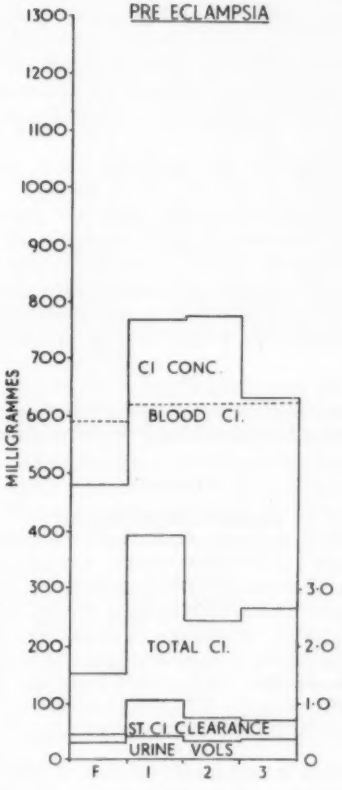

FIG. 2

Excretion curves before and after salt administration in cases of pre-eclamptic toxaemia.

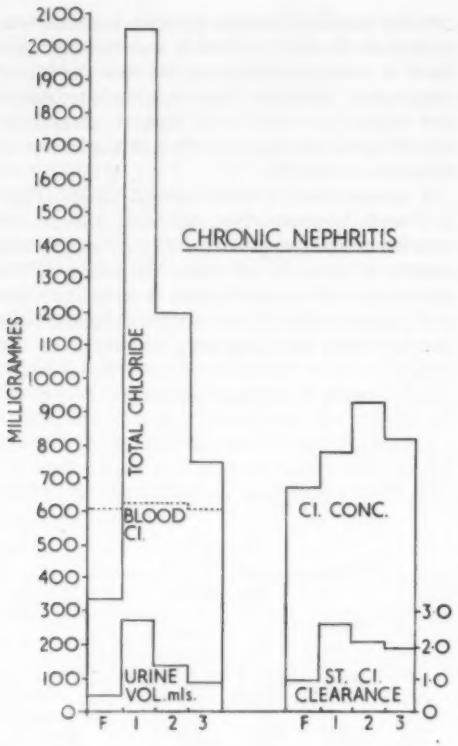

FIG. 3

Excretion values before and after salt administration in pregnant patients suffering from chronic nephritis.

TABLE V

Standard Chloride Clearance

	Pre-injection	1	2	3
Normal	1·62	2·11	2·16	1·96
Pre-eclamptic toxaemia ..	0·47	1·04	0·73	0·71
Chronic nephritis	1·01	2·55	2·14	1·92
Non-pregnant ..	1·66	2·47	2·50	2·31

clearances is very similar to that of the urinary concentration. In the toxaemic and nephritic pregnant patients, however, the clearances tend to run parallel with the volume of urine.

DISCUSSION

It is apparent that these toxaemic patients have considerable difficulty in dealing with both water and chloride. Even in normal pregnancy there is a slowing in the rate of water excretion. A somewhat similar finding has been reported by Theobald (1934). This anti-diuresis is more marked in toxaemic patients and in this instance it might be attributed to renal damage. Reference to the cases of chronic nephritis, however, indicates that this is unlikely. The anti-diuresis in normal pregnant patients is obviously of functional nature, and the results tend to suggest that the difference noted in toxaemia is one of degree rather than of character. Indeed, the findings might infer that the anti-diuresis can only occur if the kidney is structurally intact.

Characteristic differences in chloride output are shown by the various groups of patients. Rupp (1929) was probably the first investigator to report that the excretion of sodium chloride is delayed in pregnancy. A little later Coons *et al.* (1934) showed that during normal pregnancy there is a retention of chloride and according to Halmagyi and Zelenka (1949) the chloride output is diminished in toxaemia. Even prior to the injection of chloride in the present series there is considerable difference in the amount of this ion excreted by the various groups of patients, but the scatter of individual values is too great to use these basic levels as a diagnostic test. Following the giving of chloride the position becomes clarified. There is delay in excreting chloride in normal non-pregnant subjects. Pregnancy increases this delay and in this our work agrees with that of Rupp (1929). Indirect confirmation of our results is also to be found in the report of Freyberg, Reekie and Folsome (1938), who noted a gain in weight when salt was administered to pregnant patients. This difficulty in dealing with chloride is even more marked in toxaemic patients, only 4·5 per cent of the injected chloride being excreted in 3 hours. By contrast structural damage in the kidney is apparently associated with a high output of salt. It might be thought that the diminished excretion of chloride in normal and toxaemic pregnancy is related entirely to their reduced power to eliminate water. That this is not true is apparent from the other two groups of patients,

particularly those suffering from chronic nephritis. Although much more than the total amount of fluid injected is excreted by patients of the latter group they are only able to eliminate 30 per cent of the chloride. There is practically no difference in the blood chloride values of these groups, and it is evident that the "failure" to get rid of all the chloride in the experimental period of time is due to the active re-absorption of chloride by the kidney tubule. The results indicate that in toxaemia the kidney tubule is able to re-absorb more chloride than normal whereas structural damage to the kidney interferes with the re-absorptive mechanism.

The position may be stated in terms of concentration. Following the administration of the sodium chloride the urinary concentration of chloride is only twice that of the plasma in normal pregnant patients. In the pre-eclamptic group there is practically no difference between the concentrations in plasma and urine. Values for blood and urinary urea in these cases indicate that the urine in its passage along the renal tubule is concentrated at least 40 times. This low concentration of chloride can only be achieved by a process of re-absorption. The position would appear to be that in all groups there is active tubular re-absorption of chloride. Pregnancy appears to increase this activity slightly, but if complicated by toxaemia the activity is increased many-fold.

Theoretically this increased re-absorption of chloride by the renal tubule may be due to a number of causes. It is known that oestrogens and progesterone are both able to cause a retention of salt (Taylor, Warner and Welch, 1943; Thorn, Nelson and Thorn, 1938). It seems, however, that the retention is more likely to be of adrenal origin in view of the alterations in kidney function which take place in Addison's disease and adrenalectomized animals.

Whether this re-absorption and retention of chloride is a primary feature of toxaemia cannot be determined at present. It is a characteristic which appears to be shared in some degree with all pregnant patients and tissue fluid analysis (Mukherjee and Govan, 1950) suggests that the movement of chloride is of a rather passive nature. Nevertheless, even if the changes in chloride metabolism are mainly of secondary nature the results of the above experiment indicate that it may be used in a diagnostic manner.

One further point arises from this work. If the interpretation is correct and the increased tubular re-absorption of chloride in pre-eclamptic toxaemia is due to hormonal action, then it is unlikely that posterior pituitary extract will have its usual effect on the excretion of chloride in these cases.

Summary

A short salt-loading test has been carried out on 17 patients, 15 of whom were pregnant. Eight of these pregnant patients had developed pre-eclamptic toxaemia. Another 4 suffered from hypertensive disease with some degree of renal deficiency. Controls were provided by 3 normal patients in the last trimester of pregnancy and 2 normal non-pregnant subjects of child-bearing age.

There is some delay in the excretion of injected chloride even in the non-pregnant individual. This delay is increased by pregnancy and if the patient is suffering from pre-eclampsia the output of chloride is greatly diminished. By contrast, when pregnancy is complicated by renal deficiency, the rate of chloride elimination is increased and exceeds that of the normal non-pregnant individual.

Analysis of the results indicates that the delay in excretion of injected chloride in normal pregnancy is due to increased tubular re-absorption. The increased output of chloride in cases of renal deficiency is related to the structural damage and from this it is suggested that the diminished output in pre-eclampsia is due to a functional change and is to be interpreted as differing from normal only in degree. The experimental routine may be used in a diagnostic manner to differentiate pre-eclamptic toxaemia from hypertension with renal deficiency in pregnancy.

The increased re-absorptive capacity of the renal tubules for chloride in pregnancy, normal and toxaemic, is probably related to adrenal activity.

Protocols relating to details of the individual cases have been deposited with the Librarian, British Museum, London, S.W.7.

References

Chesley, L. C. (1944): *Amer. J. Obstet. Gynec.*, **48**, 565.

Chesley, L. C., and Chesley, E. R. (1941): *Amer. J. Obstet. Gynec.*, **42**, 976.

Chesley, L. C., and Chesley, E. R. (1943): *Amer. J. Obstet. Gynec.*, **45**, 748.

Coons, C. M., Coons, P. R., and Schiefelbusch, A. T. (1934): *J. biol. Chem.*, **104**, 757.

Dieckmann, W. J. (1952): *Toxemias of pregnancy*. 2nd ed. Mosby, Chicago.

Dieckmann, W. J., Pottinger, R. E., and Rynkiewicz, L. M. (1952): *Amer. J. Obstet. Gynec.*, **63**, 783.

Dieckmann, W. J., Smitter, R. C., Horner, E. N., Pottinger, R. E., Rynkiewicz, L. M., and Lundquist, R. (1951): *Amer. J. Obstet. Gynec.*, **61**, 1100.

Freyberg, R. H., Reekie, R. D., and Folsome, C. (1938): *Amer. J. Obstet. Gynec.*, **36**, 200.

Halmagyi, D., and Zelenka, L. (1949): *Gynaecologia (Basel)*, **128**, 248.

King, E. J. (1951): *Microanalysis in medical biochemistry*. 2nd ed. Churchill, London.

Mukherjee, C. L., and Govan, A. D. T. (1950): *J. clin. Path.*, **3**, 274.

Rupp, H. (1929): *Z. Geburtsh. Gynäk.*, **95**, 383.

Soffer, L. J., Lesnick, G., Sorkin, S. Z., Sobotka, H. H., and Jacobs, M. (1944): *J. clin. Invest.*, **23**, 51.

Strauss, M. B. (1935): *Amer. J. med. Sci.*, **190**, 811.

Taylor, H. C., Warner, R. C., and Welch, C. A. (1939): *Amer. J. Obstet. Gynec.*, **38**, 748.

Taylor, H. C., Warner, R. C., and Welch, C. A. (1943): *Amer. J. Obstet. Gynec.*, **45**, 547.

Theobald, G. W. (1934): *Clin. Sci.*, **1**, 225.

Thorn, G. W., Nelson, K. R., and Thorn, D. W. (1938): *Endocrinology*, **22**, 155.

A CASE OF RUPTURE OF THE BLADDER RESULTING FROM VAGINAL TRAUMA

BY

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ON 29th May, 1953, at 10.30 p.m., an unmarried but uniparous patient aged 29, whilst dancing at a local public house, fell backwards on to a microphone stand from which the microphone had been removed. She immediately felt severe lower abdominal pain with nausea. An onlooker withdrew the microphone stand which had penetrated the skirt.

The patient was taken by taxi to a general hospital where she was admitted at 11 p.m. She did not at this time vouchsafe a history of trauma and was kept under observation as a case of unexplained abdominal pain. During the night she was unable to void urine but at 9 a.m. on the 30th May she passed a small quantity of urine. It was then noticed that she had a blood-stained vaginal discharge and the history of trauma was obtained. A gynaecological opinion was sought.

The patient was slightly restless. The temperature was 100·4 F., the pulse 120 and the blood pressure 130/80 mm.Hg. The tongue was dry.

The complaint of abdominal pain was chiefly referred to the right lower quadrant. There was generalized tenderness, rigidity and rebound tenderness below the umbilicus, more marked on the right side. There was no evidence of free fluid.

On vaginal examination a small tear was felt to the right of and anterior to the cervix and there was tenderness in the right fornix. No other abnormality was detected until the examining finger was withdrawn, when there was an escape of urine. The patient was transferred to St. Mary's Hospital and speculum examination in the genu-pectoral position revealed a vesico-vaginal fistula with ragged edges about half an inch in diameter (Fig. 1). There was no sign of trauma to the external genitalia and the uterus was normal in size.

In view of the signs of peritoneal irritation, it was decided to perform a laparotomy to exclude intra-peritoneal rupture of the bladder.

At laparotomy, which was performed 16 hours after the accident, blood-stained urine was found in the peritoneal cavity. There was an irregular tear about half an inch in diameter on the right side of the fundus of the bladder, from which urine was seen to escape. No damage to bowel was found, but the peritoneum between the right round ligament and the right ovarico-pelvic ligament and overlying the right external iliac artery was torn for a distance of one inch (Fig. 2). There was a small haematoma in the wall of this artery. The uterus was normal in size.

The torn peritoneum at the pelvic brim was closed with No. 0 catgut after the insertion of penicillin and sulphathiazole powder. The hole in the fundus of the bladder was closed in three layers using No. 0 catgut. A purse-string suture was used for the mucosa, interrupted sutures for the muscle and continuous for the peritoneum. The abdomen was closed after insertion of more penicillin and sulphathiazole powder.

The patient was then placed in the lithotomy position and the vesico-vaginal fistula was closed in three layers. A purse-string suture of No. 0 catgut was used for the mucosa, and the muscle and vaginal skin were closed with interrupted sutures of linen thread (No. 60).

A Foley self-retaining catheter was introduced and a vaginal pack was inserted for 24 hours. The catheter was allowed to drain continuously without suction for 14 days.

The patient received parenterally penicillin

(450,000 units) and streptomycin 1 g. daily for 10 days. Three thousand units of anti-tetanic serum were given pre-operatively.

On the fifth post-operative day the patient complained of pain above the right iliac crest. On examination, an abscess, 8 cm. in diameter, was found in the mid-axillary line above the right iliac crest. It was incised and drained on the ninth day with immediate subsidence of a minor associated pyrexia. Odorous pus escaped which, on aerobic and anaerobic culture, grew very few colonies of non-haemolytic streptococci. X-ray prior to incision had revealed some gas but no foreign body in the abscess which was lying extra-peritoneally.

The urine was sterile before operation and remained sterile throughout the 14 days of continuous drainage. After removal of the catheter the patient was encouraged to void urine ½-hourly by day and 3-hourly by night for the first 24 hours and thereafter at increasing intervals. She was discharged fit on the twenty-fourth day, the vaginal stitches having been removed on the twenty-first.

Discussion

At first it was thought that the case might be one of attempted criminal abortion, particularly as there was no damage to the external genitalia, but there was no amenorrhoea, the uterus was seen at laparotomy to be normal in size and a Hogben test was subsequently negative. Further, the patient's skirt was obtained and a small tear (½ inch × ½ inch) was found on the back of it and to the left of the midline. The patient had fallen back on to the instrument which had penetrated the skirt, traversed the vagina and aforementioned tissues in an upward and forward direction passing from left to right: these injuries all lie on a straight line.

The subsequent development of an abscess in the right loin suggested that the tip of the microphone stand had finally "come to rest" retroperitoneally beyond the tear that it had caused in the peritoneum overlying the right external iliac artery.

At the follow-up on 16th July, 1953 and on 19th November, 1953, micturition was normal and there was no nocturia.

Acknowledgments

I am indebted to Miss D. Davison for the drawings, and to Dr. R. Ollerenshaw of the Department of Medical Illustrations, Royal Infirmary, Manchester, for the photographs of these, and to Professor W. I. C. Morris for permission to publish this case.

FIG. 2
Intra-peritoneal rupture of the bladder, and torn peritoneum overlying the right external iliac artery.

FIG. 1
Vesico-vaginal fistula to the right of and anterior to the cervix.

TWO CASES OF SLIPPERY ELM BLADDER CALCULUS IN PREGNANCY

BY

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IN both the cases reported below a piece of slippery elm bark, which had been used unsuccessfully to bring on an abortion, had passed into the bladder, and had remained there to form a stone while the pregnancy continued.

CASE REPORTS

Case 1. This patient, aged 29, was admitted to hospital on 29th September, 1951, in her second pregnancy at the 32nd week. There was a 2-months history of pain on micturition and difficulty in emptying the bladder. There had been retention on one occasion, and small stones had been passed. The urine was infected, and X-ray examination (Fig. 1) showed a bladder stone which had broken, and which was apparently surrounding a foreign body. Removal of the stone by the supra-pubic route was carried out, and it was found to be a large fragmented phosphatic one surrounding a piece of slippery elm. The bladder and space of Retzius were drained. A sulphonamide and antibiotics were given. The wound healed slowly, and 7 weeks later the patient was delivered normally of a healthy baby weighing 8 pounds 15 ounces. Six weeks after delivery she was free from urinary symptoms.

This patient was under the care of Mr. S. M. Reid, and was operated on by Mr. B. S. Cran, and I am indebted to them for permission to record it.

Case 2. This patient, aged 25, was admitted to hospital on 16th June, 1952, in her third pregnancy, when about 24-weeks pregnant, for treatment of a urinary infection. There was pain on micturition, together with haematuria and frequency. Her symptoms subsided with a course of sulphamerazine. Two months later she was re-admitted, as her symptoms had become so severe as to require morphia from her doctor. On vaginal examination a mass was felt in the anterior fornix, and X-rays (Fig. 2) showed a large foreign body calculus. After cystoscopy the calculus was removed by the supra-pubic route and the bladder and space of Retzius drained. The patient developed apnoea after the operation and various stimulants were given. Premature labour came on 24 hours after operation and the patient was delivered normally of a baby weighing 4 pounds 11 ounces which subsequently progressed well. The wound healed slowly and the patient went home after a fortnight. Later a small ventral hernia was repaired.

A similar case has been recorded by Farncombe (1935). The patient was in her seventh pregnancy and was admitted at the 34th week with a diagnosis of carcinoma of the bladder and vagina. There was a 6-months history of dysuria, incontinence and blood-stained vaginal discharge. Granulation tissue was present at the urinary meatus and a mass was felt on vaginal examination. An X-ray showed a cylindrical foreign body stone. The patient went into labour before the stone could be removed and was delivered normally of a healthy baby weighing 7 pounds. On the seventh day a stone measuring 4¼ by 2¼ inches was removed by the supra-pubic route and the bladder drained. Healing took place by the 14th day.

In addition to the 2 cases reported here I have now seen 3 others, and know of another 3, in which the same kind of foreign body entered the bladder. In 2 of these cases it was removed by vaginal cystotomy, in 2 by supra-pubic cystotomy, in the fifth it was removed directly through the urethra after dilatation, and in the sixth it was passed spontaneously after an unsuccessful attempt at removal with the operating cystoscope.

DISCUSSION

It is easy to overlook the possibility of this condition, as stone in the urinary tract is infrequent in pregnancy while infection is common. The patient will usually withhold the history of interference, as in both the present instances. The possibility of a stone being present, however, should always be considered if bladder symptoms are marked or urinary infection

persistent. Once the diagnosis is suspected it can be confirmed with ease by bimanual examination, X-rays and cystoscopy.

Removal of the stone as soon as possible seems advisable, whatever the stage of pregnancy may be, both to relieve the great distress which these patients suffer and also to prevent trauma to the bladder in labour. Drainage of the bladder also seems indicated, even with our modern resources, owing to the gross infection usually present.

The withdrawal in some way from sale of slippery elm bark might now be considered, in view of its wide use as a supposed abortifacient. This would be no therapeutic loss, and at least the occurrence of the distressing complications reported here, which are by no means rare, would be prevented.

Reference

Farncombe, R. (1935): *Lancet*, **2**, 825.

B.W. [500]

FIG. 1
Fragmented bladder calculus in Case 1.

FIG. 2
Bladder calculus in Case 2.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

A MEETING of the Council was held in the College House on Saturday, 24th July, 1954, with the President, Mr. Arthur A. Gemmell, in the Chair.

The following Officers were re-elected:

President

Arthur A. Gemmell, Esq., *M.C.*, *T.D.*, M.A., M.D., F.R.C.S.E., P.R.C.O.G.

Vice-Presidents

Prof. Gilbert Innes Strachan, *C.B.E.*, M.D., F.R.C.P., F.R.C.S., F.R.C.O.G.

Arthur James McNair, Esq., M.A., M.B., B.Ch., F.R.C.S., F.R.C.O.G.

Honorary Treasurer

Arthur Capel Herbert Bell, Esq., M.B., B.S., F.R.C.S., Hon.M.M.S.A., F.R.C.O.G.

Honorary Librarian

Arthur James McNair, Esq., M.A., M.B., B.Ch., F.R.C.S., F.R.C.O.G.

Honorary Treasurer, Australian Regional Council

John Nicholson Chesterman, Esq., M.B., Ch.M., F.R.C.S.E., F.R.A.C.S., F.R.C.O.G.

Honorary Treasurer, Canadian Regional Council

William Rodgers Foote, Esq., B.A., M.D., C.M., F.R.C.S.C., F.A.C.S., M.R.C.O.G.

Honorary Treasurer, New Zealand Regional Council

James Edmett Giesen, Esq., M.D., B.S., M.R.C.S., L.R.C.P., M.R.C.O.G.

The following Officers were elected:

Honorary Secretary

Ian MacGilchrist Jackson, Esq., B.A., M.B., B.Ch., F.R.C.S., M.R.C.O.G.

Honorary Curator of the Museum

Richard Alan Brews, Esq., M.D., M.S., F.R.C.S., F.R.C.O.G.

The following candidates were elected to the Membership:

George J. Arendt.
Antony Livio Baccarini.
Karl George Ball.
Renu Kana Banerjee.
Archibald Walker Banks.
John Maurice Barrett.
Marjorie Christine Bremner.
Antony Edward Robin Buckle.
Donald Everett Burgess.
John Duncan Bury.
Elizabeth Blanche Butler.
Keith Wallace Cochrane.
John Victor Malcolm Coppleson.
John Crossley.
Peter Harry Crowe.
Gordon Theodore Martineau Cummins.
Ben Danzig.
Kanak Das Gupta.
Sheila Paterson Davidson.
Desmond James Dooley.
Mary Muriel Essex-Lopresti.
Reginald Arthur William Feakes.
James Patrick Beaumont Fitzgerald.
Chonira B. Gangamma.
Robert Graham Gudex.
Josephine Mary Reeve Heber.
Muriel Sheila Hill.
David Howell.
Malcolm Hindmarsh Jameson.
Paul Ellis Jeffery.
Edwards William Jeyaratnam.
Gordon Forster Jolly.
Donald Keith.
Barry Lee Griffiths Kneale.
Gerald Woolf Korn.
Marjorie A. C. Kuck.
William Lees.
George Alfred Lewis.
Geoffrey Douglas Roland Lilburne.
William Griffith McBride.
Eric Vincent Mackay.
William Peter McLaughlin.
Malcolm Campbell Macnaughton.
Joan Marshall.
Paul Wanostrocht Mitchell.
Hugh O'Hara.
Donald Leslie Phillips.
Harry Maree Pretorius.
William Leslie Gray Quinlivan.
John Roper.
Leon Rubin.
Bernard Maurice Sandler.
Supriya Sen Gupta.
Kusum Kumari Sharma.
Pamela Mary Smith.
Arthur Edwin Medlock Stevenson.
Derek Tacchi.
James Gavin Amess Troup.
Jeffery Walsh.
Joseph Noel Ward.
Herbert William Wilson.
Lachlan Hardy Wilson.

REPORTS OF SOCIETIES

SOUTH WESTERN OBSTETRICAL AND GYNAECOLOGICAL CLUB

OCTOBER 1953

The President, Mr. A. Leech Wilkinson, took the chair at a meeting of the South Western Obstetrical and Gynaecological Club held at the Royal United Hospital, Bath, on Thursday and Friday, 29th and 30th October, 1953.

Dr. John Apley read a paper entitled:

UNNATURAL BABIES AND THEIR PROSPECTS

Dr. Apley began by explaining that by the term "unnatural babies" he meant those who if left to nature would probably die. He asked what happened as a result of all the efforts to save them? Was all the effort worthwhile or were we in fact producing nothing but a race of numskulls and nitwits, paralytics and pensioners? One thing he was certain of was that the prospects of such babies depended to a large extent on us.

PREMATURE INFANTS

Dr. Apley pointed out that there are two fundamental problems which come to some extent into nearly all the groups of difficult babies that have to be dealt with: prematurity and cerebral irritation. He thought it hardly necessary to emphasize that prematurity is an important problem. In England and Wales some 40,000 babies are born each year weighing 5½ pounds or less, of which some 10,000 die before they reach a month of age; in other words half the total neonatal deaths are associated with prematurity. There could, therefore, be no dispute about the importance of prematurity as a cause of death, even if there is disagreement regarding the prospects of those who survive.

He recalled that there was the school which, like Sir Robert Hutchinson, "cannot get up much enthusiasm for these premature arrivals" and "has a strong suspicion that of those who survive, a high proportion have either mental or physical defects". Was this indeed the truth? Superficially it would seem so easy to find out, but it was worthwhile going into this point in a little detail because the same difficulties bedevilled all investigations into the future of the babies who are delivered.

These were some of the difficulties as he saw them. If a large series of cases is collected it is difficult to keep more than say half under supervision for a sufficiently long period. If, on the contrary, a retrospective survey is made it is difficult to avoid selecting cases from one of two extreme groups; on the one hand, the patients or inmates of institutions for abnormal children, or on the other hand, so-called "normal" populations from whom the abnormals have been removed. Moreover, even contemporary population samples are inaccurate because premature infants tend to come from poorer families, of mothers whose age is above the average for child-bearing and to be first-born children.

Dr. Apley doubted whether the answer to this problem was likely to come from studying the highly selected populations of special premature baby units, but pointed out that a new and interesting approach was being made in that a committee had been organized to follow-up and investigate all premature babies born in one single week in England, Scotland and Wales, and compare these with equivalent children (as regards all the factors mentioned) who were not born prematurely.

This study was started in 1946, but so far only preliminary conclusions were available (Douglas and Mogford, 1953). These conclusions showed that the high mortality of premature infants extends to some degree beyond the first month of life, because of the continued liability to pulmonary infections and congenital defects. They showed also that, though premature infants spend more time in hospital in the first 2 years of life, this discrepancy from the normal is lost after that age. More important, they showed that, apart from eye defects, gross congenital defects are no more common in premature babies that survive than among normal controls.

Until final conclusions were available, Dr. Apley thought it reasonable to accept the findings of the many observers, who at present agree that there is no definite relation between the degree of prematurity and the Intelligence Quotient and that only the premature infant's liability to brain damage during birth impairs mental development.

Table I demonstrated the results obtained from 1946–1951 at the Premature Unit at Southmead Hospital, Bristol, dealing with the smallest premature babies.

TABLE I

Babies weighing less than 3 pounds 4 ounces at birth discharged from hospital

Normal and healthy	53
Died after discharge	6
Retro-lental fibroplasia	7
Cerebral palsy	5
Hydrocephalus	1
Mentally subnormal	2
Cataract	1
Webbed arm	1
	76

Dr. Apley mentioned the survey by Hess (1953) in which 9,022 infants had been studied over a period of 20 years. Of these he selected only the results of the

smaller babies, weighing 1,250 g. or less at birth, because it was these cases that gave rise to most pessimism. Of 445 small prematures 75 had died or were untraced; 270 were followed; 95 per cent were at least of average physique and 90 per cent at least of average mentality. Moreover 14 had married and of these 10 had produced 12 children among them, and showed no tendency to further premature infants.

In 29 cases among these very small premature infants, Hess had found abnormalities of the eyes; 21 were examples of retro-lental fibroplasia. On the basis of recent investigations it appeared that this disorder, with its consequent blindness, is largely due to the over-enthusiastic use of oxygen in the neonatal period and should in future be as rare as it was in the past.

Still considering the smallest prematures, among Hess's cases there was suspected intra-cranial damage in 88. Rather more than half of these developed normally: 18 remained mentally defective, and 23 had cerebral palsy though they were mentally normal.

Dr. Apley said he would emphasize again that these figures, with their long follow-up survey, represented the smaller premature infants whose prognosis is more hazardous than that of the larger ones. If all premature babies were considered the results were much more encouraging.

A further series from Birmingham quoted from Dr. Mary Crosse (1953) gave the following figures relating to a series of 7,000 premature babies followed to the age of one year: 17 per cent died before reaching the age of one year; of the survivors only 2 showed any mental or physical defect. This surely must show that the effort and expense of keeping prematures alive was well worthwhile, and not the least reward is the knowledge gleaned from these studies which is of benefit also to mature babies.

Turning to the question of intra-cranial irritation of the newborn Dr. Apley mentioned the investigation of Brander (1937) who studied the intelligence quotient of premature infants and found that birth trauma had a more unfavourable effect on mental level than had birth weight. This obviously offered a challenge to all concerned in the delivery of babies.

The immediate and the long-term prognosis of babies of all degrees of maturity had been studied by Craig (1950), who assessed 593 infants over a period of 6 months to 5 years who had suffered from various degrees of diagnosable intra-cranial irritation, from the mildest to the most severe. It was surely of practical interest to realize that Craig found that the infant's size or maturity, and the need of instrumental delivery, was less important as adverse factors than foetal distress, severe asphyxia and either long or precipitate labour. Of his 593 cases 36 died, 19 remained with a physical disability alone, and 22 had a combination of mental and physical defects, and from these studies Craig had deduced a most helpful prognostic guide: that it is the rare exception for permanent sequelae to develop in an infant who has no signs of residual disability in the neonatal period after intra-cranial irritation.

Dr. Apley mentioned the increasing tendency to treat infants with the slightest suggestion of intra-cranial damage, and indeed *all* infants, by withholding feeds of all sorts until they are ready for it; a form of therapy which over a period of several years seemed to have improved the prognosis considerably.

Rhesus Incompatibility

Before the basis of haemolytic disease of the newborn was understood the mortality rate among affected infants was distressingly high, and severe disorders among the survivors were common. The introduction of early exchange transfusion had altered the prognosis so dramatically that we might well ask why this method of treatment is not yet practised everywhere. Dr. Apley thought the picture was confused because it so happened that the introduction of exchange transfusion into this country in 1947, following the work by Diamond (1947) in the United States, coincided with the advocacy of premature induction of labour for the same disorder. In the event, the permutations and combinations resulting from the haphazard use of one or both of those methods confused the issue very decidedly. Now at least the answers had been made clear and he referred to an investigation by the M.R.C., on which a preliminary report had been published by Mollison and Walker (1952), which made it quite clear that the reason for the disappointing mortality rate at some centres using exchange transfusion was due to the high proportion of infants with the added disadvantage of prematurity, i.e., to the premature induction of labour. Markedly premature infants, whether spontaneously premature or induced, show a high mortality rate, which is difficult to reduce by any form of treatment, even exchange transfusion. It was true that with premature induction there is apt to be a lower incidence of stillbirths, which has prejudiced some observers, but the incidence of neonatal disease is relatively much greater. As a result, the *total* death rate is significantly higher than in series of cases of spontaneous delivery, with their higher proportion of mature babies. Consequently Dr. Apley thought that the early induction of labour was inadvisable and should be abandoned.

Moreover, in premature infants with rhesus incompatibility there was a considerable increased risk of kernicterus. This was in sharp contrast to the incidence of kernicterus in mature infants. In mature infants treated by exchange transfusion the incidence of kernicterus was negligible (Walker, 1951).

In Dr. Apley's opinion, the high death rate in infants treated by simple transfusion was almost entirely due to kernicterus and the corollary, that simple transfusion should be abandoned, he thought had been clearly demonstrated.

He would like to sum up his views with regard to rhesus incompatibility as follows:

1. Premature induction of labour should be given up.
2. If treatment is necessary in the early stages exchange transfusion is undoubtedly the method of choice.
3. Since exchange transfusion should be undertaken within 8 (or at most 12) hours of birth, routine antenatal rhesus testing is necessary.

4. In all cases where the disorder is likely to occur the delivery should be at a hospital where the necessary investigations (e.g., cord blood testing) and treatment can be started without delay.

Recent figures from the Southmead Regional Transfusion Centre were quoted as follows:

	Method	Total cases	Deaths	Mortality
1949–51	simple transfusion	16	7	44%
	exchange transfusion	23	4	17%
1951–53	exchange transfusion	65*	7†	11%

(* including 13 premature infants.)
(† of which 6 were in premature infants.)

Caesarean Section

This was no trifling matter since the incidence of Caesarean section in hospital practice in this country was between 2 per cent and 10 per cent. Much had been written of the effects on the mothers, but perhaps the effects on the babies were not so widely appreciated.

To quote from two large series, Dr. Apley referred to Dieckmann and Seski (1950) in America, who found among 4,497 cases there was a foetal (that is combined stillbirth and neonatal) death rate of 5·9 per cent and among these prematurity was a significant factor in 55 per cent. In this series it was striking to note that the mortality among infants delivered in hospital was only 2·4 per cent. These figures were somewhat similar to those of Marshall (1949) who had reviewed 7,762 Caesarean operations carried out in the large teaching hospitals of Britain and both series presumably reflected at least in part the more meticulous care of the newborn baby in hospital after Caesarean section. Probably the meeting would agree that the most important single item was the clearing of the respiratory tract by suction and posture, thoroughly and rapidly, thus minimizing the risk of what is becoming known as "hyaline membrane disease", but the more recent innovation of gastric suction to avoid the regurgitation and aspiration of large amounts of ingested amniotic fluid might not be so widely known and practised. The combined technique in all Caesarean babies consisted of draining the respiratory and alimentary tracts by suction and posture before encouraging respiration and using these methods latterly Smith (1951) evoked astonishment and admiration with a series of 204 normal infants, delivered by elective Caesarean section, with no deaths.

As regards the ultimate prognosis for Caesarean babies, Dr. Apley said he could find no figures anywhere, though he suspected that there might be something interesting to show if these infants could be compared with those born spontaneously.

Infection

Dr. Apley pointed out that before the days of antenatal care and the discovery of antibiotics there were very many more deaths among infected babies than there were now and accordingly the survivors should be classed among the unnatural babies, who would have died if left to Nature. There was, however, no room for complacency, since many were now running into difficulties with the development of resistant bacterial strains, and the diagnosis of neonatal *Bact. coli* meningitis, for example, was no easy matter, as many might have found by bitter experience.

He would like also to say a little about the ultimate prognosis. By way of illustration he mentioned that recently he had been investigating the incidence of simple "snuffles" in the newborn. In over 100 cases at 4 maternity centres, with an incidence of between 1 to 4 per cent, it would reassure the meeting to learn that there was no case of syphilis, despite the teaching in the textbooks. Nevertheless this apparently mild condition—so apparently trivial as frequently to escape recording in the patient's notes—might persist and sow the seed for respiratory disorders in later years.

Congenital malformations

The last topic touched upon comprized many conditions of which hare-lip and cleft palate, meningocele, rectal or oesophageal atresia, and meconium ileus were a few. There was no time or need to dwell on the excellent results surgery could produce in many of these cases. In many of them, however, early diagnosis was essential for successful treatment, and here complete trust and co-operation between the obstetrician and the paediatrician and the nursing staff produced the most satisfactory results for everybody concerned.

Dr. Apley concluded his paper with an illustration from the Benjamin Knox Rachford Lectures by Clement A. Smith (1951) entitled "The Valley of the Shadow of Birth".

References

Brander, T. (1937): *Acta psychiat., Kbh.*, **12**, 313.
Craig, W. S. (1950): *Arch. Dis. Childh.*, **25**, 325.
Crosse, V. M. (1953): *Proc. R. Soc. Med.*, **46**, 882.
Diamond, L. K. (1947): *Proc. R. Soc. Med.*, **40**, 546.
Dieckmann, W. J., and Seski, A. G. (1950): *Surg. Gynec. Obstet.*, **90**, 443.
Douglas, J. W. B., and Mogford, C. (1953): *Brit. med. J.*, **1**, 748.
Hess, J. H. (1953): *Pediatrics*, **11**, 425.
Hutchinson, R. (1940): *Lancet*, **2**, 799.
Marshall, C. M. (1949): *Brit. med. J.*, **2**, 147.
Mollison, P. L., and Walker, W. (1952): *Lancet*, **1**, 429.
Smith, C. A. (1951): *Amer. J. Dis. Child.*, **82**, 171.
Walker, W. (1951): *Brit. med. J.*, **2**, 1142.

Discussion

Mr. Patrick Russell (Exeter) said that with regard to Rhesus sensitization he was not completely convinced about the condemnation of inducing labour, for if, as seemed generally agreed, cases left to term showed a considerable rate of deaths *in utero*, then induction might be expected to offer some definite salvage rate.

In reply Dr. Apley agreed that induction might lead to fewer stillbirths, but he was convinced now that it increased the neonatal death rate and that the combined figures appeared definitely to be improved by avoiding induction. He mentioned that it was unfortunate that the maternal antibody titre was of little guidance in these cases.

Professor Gordon Lennon (Bristol) was also interested in the question of inducing labour in rhesus sensitization. There had been a very marked swing of opinion away from induction; perhaps, he sometimes thought, too far in the direction of extreme conservatism. Personally he could not believe that prematurity alone was so very commonly the cause of death in such infants. It was his practice in induce labour in the last weeks of pregnancy or anyway at term if clinically the foetus appeared large.

With regard to induction generally, he drew attention to Walker's work in oxygen estimation and mentioned a series of cases of placental insufficiency from previous threatened abortion, toxaemia, etc., in which the foetal mortality had been reduced from 44 per 1,000 to 11 per 1,000 by timely induction.

Following this work it had been found that the induction rate had been doubled for all deliveries—that induction for forecast foetal distress doubled the incidence of Caesarean section, but halved the number of sections required for difficult labour.

As an example of forecast foetal distress he described a personal case which had survived an early threatened abortion. He had induced labour at 39 weeks and after delivery had found a large organized retroplacental clot.

Referring briefly to the remarks in the paper about gastric lavage of the newborn, it had been found that the stomach contents in infants delivered by section averaged 20 ml. against a figure of 2 ml. for those delivered per vaginam. Squames and meconium were plentiful in the gastric contents and were probably a factor in the production of so-called hyaline membrane disease. He would like the import of his remarks to be that induction of labour was coming back into favour.

Dr. Apley replied that all this bore out the great need for improvement in our technique in dealing with infants born by difficult labour. In Rhesus cases, if there was certainty that the baby was large, then he agreed that induction at least was probably harmless, but that the point was "how can we pick out the few who need induction?"

Mr. D. S. Foster (Tiverton) pointed out that in these cases there must be a proportion who were spontaneously delivered prematurely because of some innate cause which worsened their chance, and that this fraction possibly increased to an unknown extent the evil consequence of prematurity.

Mr. D. R. Kilgour (Southampton) invited criticism of his views that pharyngeal catheterization of the newborn was unpleasant for the infant and productive of congenital spasm. He therefore forbids the practice and finds his results no less satisfactory than those of his colleagues.

Dr. Apley agreed that instrumental laryngoscopy was unnecessary, but said that he was convinced that simple suction through a rubber catheter passed by an experienced nurse and followed by gravity drainage was a valuable practice free from any significant trauma.

Mr. Philip Mitchell (Winchester) pointed out the fact that the infant really in need of resuscitation was always limp and therefore easily intubated without trauma.

Mr. Bryce Blair asked for a description of the technique of gastric lavage and, after a personal demonstration had been declined, Dr. Apley said that, with the infant on its side, a small rubber catheter was passed blindly and could be relied upon always to pass down the oesophagus rather than the trachea.

Professor Gordon Lennon mentioned the practice of leaving the catheter in the stomach and supplying oxygen through it as a measure of resuscitation and Dr. Apley agreed that there was something to recommend it, but that it raised a separate and much larger problem.

Mr. Brooke (Barnstaple) stated that at Woolwich oxygen via a gastric catheter remained the standard method of resuscitation.

The President, in the course of thanking Dr. Apley for his paper, remarked that he had discovered this method of oxygenation quite accidentally, but usually had hastily withdrawn the catheter before any benefit could have been fully manifest.

Mr. Bryce Blair read a paper entitled:

The Effects of Hexamethonium Compounds on Pregnancy Toxaemia

Mr. Bryce Blair began by reminding the meeting that hexamethonium salts are not without danger when used in the treatment of pregnancy toxaemia and pointed out that to obtain good results from the drug a heavy burden was placed upon the nursing staff in the matter of recording ¼-hourly blood pressure readings, sometimes for weeks on end. He thought that the use of such drugs in pregnancy toxaemia was no more than a valuable stopgap until we knew more of the disease.

Hexamethonium salts had been used previously in pregnancy toxaemia and conflicting opinions recorded as to their value. They appeared to be useless when given by mouth. Mr. Bryce Blair attributed the improved results to be shown in his own series to minute care in regulating the dosage by day and by night in response to ¼-hourly reading of the blood pressure and he paid tribute to the work of Dr. Bruce Lockhart, lately Obstetric Registrar to the Royal United Hospital, Bath, in this connexion. That the series of treated cases showed a foetal survival rate of over 70 per cent as against one of 18 per cent in the control series was very largely due to Dr. Bruce Lockhart.

The work at Bath began in 1951 as an attempt to find an answer to Professor F. J. Browne's dictum that "the really difficult cases are those in which albuminuria, with its dangers of intrauterine death, develop before the foetus is viable, that is about the 31st or 32nd week of pregnancy. We have then two alternatives; either to allow the pregnancy to continue with the daily risk of foetal death, or to terminate the pregnancy and obtain a child that is too premature to survive. A week or two gained at this time may make all the difference."

Mr. Bryce Blair said that the criteria used in selecting "severe cases" were: patients having a blood pressure of 160/100 twice in 24 hours, or albuminuria of 3 g. per litre, or both, and who did not respond to routine treatment.

The technique employed was: (1) In order to minimize dangers, the patient was kept in a "propped up" position in bed. (2) The blood pressure was recorded every 15 minutes day and night in severely ill cases. (3) Initial test dose of 5 mg. hexamethonium was given to exclude sensitivity, and the drug was always given by intramuscular route (except in one case). (4) Every dose of hexamethonium was assessed upon the state of the patient and the result upon the blood pressure of the previous dose. (5) Initially the drug was often given hourly and the dose increased cautiously until an effect on the blood pressure was achieved; these doses were then "summated" and given as one dose 4-hourly, reducing or increasing it as necessary. (6) Blood pressure readings were taken by a nurse trained in the technique, one of whom was in constant attendance in the ward, and ampoules of Methedrine and a sterile syringe and blocks for elevating the foot of the bed were kept immediately available. (7) Hexamethonium was discontinued as soon as labour started. (8) The patients had a salt free diet with added protein; Petrolagar was used routinely; magnesium sulphate and, if necessary, prostigmin and enemata were employed to keep the bowels active and prevent ileus. (9) Hexathide was used for small doses and bromide or tartrate for larger doses. Morphine derivatives were only used on one occasion in conjunction with them.

Effects

Mr. Bryce Blair reported that *blood pressure* was reduced in 29 out of 30 cases, being more easily effected if essential hypertension was also present. The response to a single dose varied in extent and timing; the systolic pressure was reduced more markedly than the diastolic, and it was usually possible to keep the systolic pressure below 150 mm.Hg. He said that the ½-hourly blood pressure readings became necessary as drug tolerance developed, but the dosage often had to be reduced after a variable number of days when the blood pressure became more stable. It was noticed that blood pressure always fell during sleep and rose when the patients' emotions were aroused, e.g., by visitors. The effect of posture was also noticed in all cases.

Mr. Bryce Blair said that *albuminuria* was reduced in all cases, but only in a few cases did it disappear entirely. He said that bladder atony was present and often low-grade infection ensued as a consequence, possibly secondary to bowel stasis.

The idea that a critical level of blood pressure causes albuminuria was not borne out. The urine of all patients was albumen-free on discharge from hospital, and recurrence was not noted in the follow-up of untreated cases.

Mr. Bryce Blair said that, while the urinary output was quickly in excess of fluid intake, *oedema* tended to diminish and become dependent. Famine oedema was present in 2 cases and responded to treatment in 1.

Eclampsia. None of the 28 cases developed eclampsia despite prolongation of pregnancy. Of these 28 cases, 11 had a blood pressure of 160/110 mm.Hg or more, with an albuminuria of at least 4 g./litre. In 4 of the cases eclampsia became imminent when they deteriorated rapidly following the discontinuation of hexamethonium during labour.

Uterus. Mr. Bryce Blair said that the uterus clinically became hypotonic in all cases treated with hexamethonium for more than 24 hours. The drug did not prevent spontaneous onset of labour and it seemed to have a specific effect upon the cervix, which was always "taken up", very lax and often dilated when examined at the time of induction. The induction onset of labour interval was not increased.

Mr. Bryce Blair thought that three observations from the series regarding the utero-placental circulation should be noted: (1) No case of accidental haemorrhage occurred after treatment started. (2) Placentae examined showed either old or very recent infarcts, i.e., those which had occurred before hexamethonium treatment had been commenced, or those which had occurred after it had been withdrawn. (3) The live birth rate was much improved.

The labours were rapid, there being no delay in the 1st, 2nd or 3rd stages. Colicky uterine contractions were improved.

Hexamethonium salts are concentrated in the "liquor", and other workers have attributed neonatal death to this (from pneumonia and ileus). In a series of 30 cases 1 intra-uterine death occurred in exceptional circumstances. Of the neonatal deaths 1 was caused by torsion of the large gut, which was possibly attributable to hexamethonium effect.

Mr. Bryce Blair said that it seemed from these results that the effects of hexamethonium compounds were on the whole beneficial in this disease, firstly, because the foetal survival rate was apparently increased, and secondly, with regard to the maternal condition it seemed to prevent any severe or lasting damage to the tissues; the toxic look of the patient disappeared, albuminuria diminished, oedema tended to get less, jaundice did not develop, and the baby grew and survived the disease, and often the hazards of labour.

In order to illustrate some of these points, Mr. Bryce Blair showed a short film strip giving the results and the effects of hexamethonium on a typical case of pregnancy toxaemia as shown on blood pressure charts.

The case in question was a primigravida, aged 26, admitted as an emergency, the period of gestation on admission being 32 weeks. She was obese. She looked toxic, there was oedema of the conjunctivae and fingers, and pitting oedema of the legs up to the knees. The blood pressure was 140/96, and the urine was almost solid with albumen.

She was placed on routine treatment for toxaemia of pregnancy: (*a*) Luminal Gr. 1, t.d.s. (*b*) Salt free diet. (*c*) Restricted fluids. (*d*) Complete rest in bed.

She was admitted at 4 p.m. and by 8 p.m. was excessively alert, with a blood pressure of 190/130. Sodium

luminal, gr. 3, was exhibited by intramuscular injection and repeated at 6 a.m. next day. By 6 p.m. on the following day, the oedema was visibly increasing the Esbach estimation of the admission specimen of urine showed 16 g. albumen/litre of urine.

It was noted that the time taken for Hexathide to produce its greatest effect was longer at night, and that during the day any incident arousing excitement in the patient was reflected in the blood pressure chart, thus apparently indicating that the hexamethonium only acted on the nervous vascular apparatus, and that humoral hypertensive mechanisms (adrenaline) could still act.

Mr. Bryce Blair said that drug tolerance normally developed in non-pregnant hypertensives on treatment with hexamethonium, and, while it occurred in some cases in this series, it had disappeared often enough to suggest that sometimes at least hexamethonium had an actual curative effect on pregnancy toxaemia.

By the sixth day after admission, the patient's general condition had very much improved, there was slight oedema, the albuminuria was 1 g./litre and the urine output had been daily in excess of the fluid intake. When the blood pressure was well under control, it was considered safe to reduce the number of blood pressure readings, particularly through the night, but it was found necessary to reinstitute them, a purely routine dose not being satisfactory and every individual dose having to be considered.

Twenty days after admission, the foetus seemed to have grown considerably and, while the blood pressure was controlled, an albuminuria of 2 g./litre had redeveloped and persisted. It was feared that the foetus might outgrow its placenta, and accordingly a surgical induction was performed with a Drew Smythe catheter.

The cervix was found to be thick but "taken up"; it was very soft and 2-fingers dilated. (This was found to be the case in 11 of the 14 cases treated with hexathide in which the state of the cervix was noted.)

The hexathide was discontinued as soon as the surgical rupture of the membranes had been performed, slight instability of the blood pressure developed, with a sharp rise when labour started following an oil, bath and enema. The patient had a spontaneous delivery after 4 hours 50 minutes in labour. The baby weighed 5 pounds and was alive and well. The puerperium was uneventful. The baby made normal progress. The patient's blood pressure on discharge from hospital was 140/90, 4 weeks after discharge it was 140/100 with no albumen in the urine, and 3 months later it was 130/90.

Discussion

The President thanked Mr. Blair for his paper and invited comment from members.

Mr. Philip Mitchell said that while he had had no experience of these drugs in pre-eclampic conditions, he was fortunate in being associated with an anaesthetist well acquainted with their administration and who had co-operated in the treatment of two cases of eclampsia.

The first was a post-partum case, who had 4 fits with a sudden rise of blood pressure to 280/100. She received no sedative, but was given two doses of Hexathide mg. 25 and mg. 50, which produced a dramatic fall in blood pressure within a quarter of an hour.

There were no further fits and no relapse occurred.

The second case was the worst example of eclampsia he had ever seen. The patient, a primigravida, aged 23, had 4 fits at home and 5 in an ambulance bringing her to hospital. On admission the systolic pressure was

TABLE I

The Results of Hexamethonium Treated and Control Groups

	Controls	Hexamethonium
Total number of cases	16	16
Average age of patients on admission	31·8 years	32·3 years
Average period of gestation on admission	32·5 weeks	32·7 weeks
Number of Primigravida	7	12
Number of Multipara	9	4
Average number of days from admission to delivery	20·8 days	20·2 days
Average duration of treatment with Hexamethonium		15·25 days
Mode of onset of Labour (1) Surgical Induction	5 cases	11 cases
(2) Spontaneous	11 cases	4 cases
(3) Caesarean section	0 cases	2 cases
Average birth weight in child	3 lbs. 12·8 ozs.	4 lbs. 6 ozs.
Foetal Results (1) Intra-uterine deaths	8 cases	1 cases
(2) Stillbirths	5 cases	0 cases
(3) Neonatal deaths	0 cases	4 cases
(4) Live births	3 cases	15 cases
(5) Living children	3 cases	11 cases
Foetal Survival percentage Overall	18·75	68·75
Corrected	18·75	73·34

TABLE II

Follow-up of Blood Pressure and Albuminuria in those Cases with More than 7 Days Therapy with Hexamethonium and Over 4 Months Post-partum

Case	B.P. before 20th week	Maximum B.P.	Maximum albumen	Duration Hexamethonium	B.P. at Postnatal clinic	Albumen P.N. clinic	B.P. later	Comment
G.A.	100/70	170/100	12 gm./litre	10 days	110/70	Nil	100/70 20 months	Has had second pregnancy without any rise of B.P.
S.A.	160/100	200/140	24 gm./litre	19 days	160/100	Nil	155/95 18 months	Hemiplegia. Hexamethonium continued after delivery for a period under physicians.
K.S.	150/90	200/120	+	37½ days	190/120	Nil	190/110 8 months	Physicians consider this a labile hypertension. Quite symptom-free at present.
D.C.	120/80	190/130	16 gm./litre	19 days	140/100	Nil	130/90 8 months	
E.D.	140/86	170/100	12 gm./litre	8 days	130/88	Nil	118/80 4 months	
D.B.	130/85	170/110	1 gm./litre	28½ days	130/90	Nil	140/85 6 months	
M.G.	124/68	190/130	Trace	12 days	180/125	Nil	150/90 6 months	
V.R.	?	160/110	2 gm./litre	17 days	160/115	Nil	135/85 5 months	

unrecordable and the diastolic registered 180. She was practically in a condition of status eclampticus, 58 fits being recorded during the night. Treatment was at first conventional with Morphia gr. 1½ intravenously, Sodium Luminal gr. iii by intramuscular injection and Potassium Bromide by mouth. At 11 p.m. on the evening of admission Hexathide mg. 25 was given. This had no effect on the fits, but reduced the blood pressure to 240/100 and for the rest of the night the patient was persistently in a wet bed, which diuresis was the first sign that her condition was anything less than moribund. By 6 a.m. the following morning her condition had improved sufficiently to allow puncture of the membranes and at 11 a.m. a stillborn foetus was delivered. Uneventful recovery followed and the patient is now apparently normal.

It was interesting to record that a sister of the patient suffered a similar disaster and died of it.

Mr. Bryce Blair commenting on the special liability of certain individuals and families to fits, recalled the empirical advice of past teachers. "Blondes and women excessively striated" he said were notably subject to them and, on a more scientific plane, he mentioned McIntosh's paper on cerebral dysrhythmia, demonstrable by encephalography, as a means of forecasting individual liability to convulsions.

Mr. D. R. Kilgour asked whether in the series described sedatives were used in conjunction with Hexathide.

Mr. Bryce Blair replied that sedatives were given, but not necessarily as a routine. Usually small doses of luminal given morning and evening proved valuable in addition.

Professor Gordon Lennon said that all this was very controversial. He had done some work for Ciba in testing their particular preparations and had come to the conclusion that this type of drug was dangerous. One case had developed severe accidental haemorrhage and required Caesarean section while on the drug.

Listening to the paper, he was reminded of the work of Dewar who had introduced Avertin for the control of eclampsia and still found it satisfactory. He had had some conversation with Dewar recently and had heard of some cases allowed to proceed with pregnancy after control by Avertin.

They appeared to have settled down well and personally he would like to examine the possibility of more cases of eclampsia being treated conservatively with initial control. He was tempted to wonder whether in the case demonstrated effects similar to those attributed to Hexathide might not have occurred naturally. At all events he would recommend extreme caution in the use of Hexathide, though he admitted being impressed by the strikingly improved foetal mortality rate illustrated in a recent paper.

Mr. Bryce Blair agreed that the greatest caution was necessary when using Hexathide and repeated that an adequate volume of nursing staff to exercise chemical control was absolutely imperative.

The President, in expressing the thanks of the Meeting for the paper, said that whatever doubt might lie in the minds of others, he, as a rather close onlooker of the work described, had been immensely impressed by the very striking uterine hypotonus and cervical laxity produced in the cases, and of course by the consequently favourable progress of the foetuses.

NORTH OF ENGLAND OBSTETRICAL AND GYNAECOLOGICAL SOCIETY

FEBRUARY 1954

A Meeting of the North of England Obstetrical and Gynaecological Society was held in Liverpool on Friday, 19th February, 1954, with the President, Dr. K. V. Bailey in the Chair.

Mr. A. H. C. Walker described a case of

RUPTURE OF THE BLADDER RESULTING FROM VAGINAL TRAUMA

(This article appears on page 497 of this issue.)

Discussion

Prof. W. I. C. Morris had seen two cases of perforation of the bladder due to self-instrumentation in order to procure abortion. Mr. D. C. Racker told of a woman who introduced a nail file into the vagina. It penetrated into the bladder and lay with its tip in one ureteric orifice. Other members recounted their experiences with foreign bodies in the female bladder but none had seen a case strictly comparable to Mr. Walker's.

Mr. T. B. Fitzgerald read a short paper illustrating

HYBRID SYNDROMES IN ANTE-PARTUM HAEMORRHAGE

When Rigby drew the classical distinction between accidental and inevitable ante-partum haemorrhage, a great step forward was made in the understanding and the treatment of this serious obstetric condition. Bender (1953), in a paper read before the Society, called attention to the fact that this dividing line was far from absolute, and that toxaemia and toxaemic placental separation might be associated with a placenta praevia. In particular Bender had stated that it was possible that a woman with placenta praevia who developed toxaemia might bleed from a mechanical cause earlier and as a result of toxaemia later. Mr. Fitzgerald said that one of his cases dramatically illustrated this point.

On the other hand, haemorrhage with the classical clinical features of placenta praevia might occur where the placenta was situated in the upper uterine segment. The textbook emphasis on Rigby's classification seemed generally but unfortunately to produce the impression that there was an iron curtain, rather than a somewhat indefinite no-man's land, dividing the two principal types of ante-partum haemorrhage. He would therefore illustrate by case histories three intermediate types of cases.

(1) Placenta praevia with both mechanical and toxaemic bleeding. (2) Accidental haemorrhage mimicking placenta praevia, and (3) Placenta praevia mimicking accidental haemorrhage.

Case 1. A multigravid patient, aged 40, was admitted to hospital on 1st September, 1950 with sudden painless vaginal bleeding at the 32nd week of gestation. She had been well previously apart from a mild degree of hypertension and a small blood show at the second month. On admission the blood pressure was 170/95 and the urine showed no albumen; her general condition was good and the uterus was soft and corresponded with her dates. The foetus presented by the breech and the foetal heart was clearly audible. Two days later the blood pressure was 138/80 but a further painless loss of 10 ounces occurred. The foetus was then lying obliquely. The condition was thought to be most probably a placenta praevia, and conservative treatment was advised. But the blood pressure began to rise and 12 days later was 165/110 with an Esbach value of $\frac{1}{2}$ g. However, in the absence of headaches or visual symptoms and with little oedema, it was decided to temporize yet a little longer. On 21st September at 2 a.m. the patient had a very small loss estimated at 2 or 3 ounces only, but with this she became profoundly shocked, with a blood pressure of 54/?. The lower abdomen was very tender and the foetal heart could no longer be heard. In spite of the most energetic resuscitative measures, after 3 hours, the sytolic blood pressure was only 88 and showed signs of falling again. Gentle examination under anaesthesia confirmed the presence of a placenta praevia (Type 3), and a rapid Caesarean section was performed. A stillborn baby was extracted together with a considerable quantity of blood clot from the upper uterine segment. The placenta lay on the posterior uterine wall with its lower part completely covering the internal os while its upper two thirds were almost completely detached by masses of dark blood clot. A smooth pale infarcted cotyledon which overlay the os had been responsible for the initial typical bleeding of mechanical origin, contrasting with the severe, largely concealed, accidental haemorrhage of toxaemic origin. It was surprising that the haemorrhage could remain concealed in spite of its proximity to the cervical os. The patient's recovery was very gratifying after this ordeal.

Case 2. A multigravid patient, aged 35, was admitted on 18th March, 1951 at the 38th week of the gestation with a blood pressure of 120/78 and normal urine, and bleeding vaginally. The uterus was a little tense but was not tender, and the foetal parts could be made out, the foetal heart being present. The head was mobile above the brim, and the resident made a diagnosis of placenta praevia, Type 1 or 2. As the patient was in labour and bleeding continued, examination under anaesthesia was performed, when the cervix was found to be thick and only 1-finger dilated. On pushing a finger gently through the os no placenta could be felt and gushes of heavily blood-stained liquor were released. As the foetal heart rate had now dropped to 100 per minute it was decided that a rapidly performed Caesarean section would best serve the interests of mother and child. A living baby was obtained. The site of the placenta was interesting, its lower edge just reaching the upper retracted lip of the transverse incision in the lower uterine segment. It would therefore be a matter of opinion as to whether this was haemorrhage from a placenta normally situated in the upper segment (as he himself preferred to regard it) or whether it might just be a Type 1 placenta praevia. The separation which led to the bleeding would seem to have been of the mechanical type. Another point of interest

was the heavily blood-stained liquor amnii, due to the irruption of the concealed blood into the amniotic cavity; the release so obtained was one reason why tenderness and rigidity of the uterus, normally associated with concealed haemorrhage, might not develop. The baby showed melaena and altered blood in the vomit due to the swallowing of this blood-stained liquor.

This case showed, therefore, an accidental haemorrhage from a normally situated placenta, the separation being mechanical in origin and the symptoms aping those of placenta praevia.

Case 3. A multigravid patient, aged 31, was admitted on 21st September, 1953 with a history of a painless vaginal loss of about 10 ounces of blood at the 34th week of gestation. The blood pressure was 120/85 and the urine was clear. With a provisional diagnosis of placenta praevia she was kept under observation in the antenatal ward without further incident, until 12 days later, when the blood pressure had risen slightly to 140/95. On this day, she developed dull constant lower abdominal pain, followed and accompanied about an hour later by dark vaginal bleeding. The uterus was rather larger than had been previously noted, and it was tense and tender, particularly over the lower segment. The presentation could not be made out and the foetal heart could not be heard. Examination under anaesthesia was performed and the placental edge was found high up on the posterior uterine wall. The membranes were ruptured and the patient was delivered later of a stillborn child. In this case, therefore, a high lateral or Type 1 placenta praevia produced signs and symptoms classically associated with accidental haemorrhage.

Discussion. Mr. Fitzgerald remarked that since the basic distinction between accidental haemorrhage and placenta praevia was the site of the placenta relative to the line dividing the upper from the lower uterine segment, it was not surprising that a number of cases showed mixed or even misleading characteristics. The frequency was indicated by the number which might be classified as ante-partum haemorrhage of unknown origin, which may amount to as much as 50 per cent of all cases of such bleeding (Browne, 1947).

As the treatment of the two main forms of haemorrhage was often different, it was important to bear in mind the existence of these hybrid or intermediate types. For example, it must be considered before accepting the suggestion that Caesarean section could be properly performed in cases of ante-partum haemorrhage, without a previous vaginal examination.

Further the additional risk involved in the conservative treatment of placenta praevia, when toxaemia might supervene, must be recognized. Looking back on the first case described conservatism had been carried too far.

References

Bender, S. (1953): *J. Obstet. Gynaec. Brit. Emp.*, **60**, 509.

Browne, F. J. (1947): *Antenatal and Postnatal Care.* 6th ed. Churchill, London.

Discussion

In the subsequent discussion the main points brought out were, firstly, that in skilled hands vaginal examination when placenta praevia was suspected involved but a negligible risk; and, secondly, that in selected cases of accidental haemorrhage early abdominal intervention gave the best results for mother and baby.

Dr. J. K. Russell read a short paper on

Intravenous Ergometrine and the Undiagnosed Second Twin

Dr. Russell said he wished to draw attention to a complication associated with the use of intravenous ergometrine in the management of the third stage of labour. During the past two years, on 4 occasions in the Princess Mary Maternity Hospital, an undiagnosed second twin has been discovered after the administration of intravenous ergometrine.

Case 1. The patient, a gravida-3, aged 39 years, was admitted to hospital at the 36th week as an emergency case of ante-partum haemorrhage, and 3 hours later she delivered spontaneously a live male child weighing 4 pounds 10¼ ounces. Intravenous ergometrine 0·5 mg. was given with the birth of the anterior shoulder but, as soon as the child was born, it was realized that a twin pregnancy was present. The second twin was presenting as a vertex and within a few minutes a female child weighing 3 pounds 15½ ounces was delivered spontaneously. The placenta was then easily expressed. The twins were in good condition at birth and made satisfactory progress.

Case 2. The patient, a gravida-2, aged 24 years, was admitted in premature labour at 30 weeks. The uterus was noted to be slightly larger than the gestation period but a twin pregnancy was not suspected. Twenty-five minutes after admission a male baby weighing 3 pounds 6 ounces was extracted by forceps under local analgesia; intravenous ergometrine 0·5 mg. was given with the delivery of the anterior shoulder. A twin pregnancy was diagnosed as soon as this child had been delivered. A vaginal examination showed the presentation to be a footling and the membranes were ruptured by the operator. Strong uterine contractions began at once but no progress was made and after an interval of 8 to 10 minutes a general anaesthetic was commenced. Vaginal examination revealed a constriction ring in the lower part of the uterus. The anaesthetic was deepened and with some difficulty a breech extraction was carried out. The child, a male, weighed 3 pounds 10 ounces and was limp and blue at birth; respirations were never satisfactorily established and the infant died at 55 minutes. A post-mortem examination was not obtained but the cause of death was presumed to be anoxia and possibly traumatic cerebral damage. The first twin made satisfactory progress.

Case 3. This patient, a gravida-3, aged 25 years, was admitted in labour 2 weeks before term. After a labour

lasting 3 hours she delivered spontaneously a male child weighing 6 pounds 14 ounces. Ergometrine 0·5 mg. was given intravenously with the delivery of the anterior shoulder but only with the delivery of this child was a twin pregnancy diagnosed. Vaginal examination showed that the second twin was presenting by the breech. The membranes were not ruptured on this occasion and the operator, with his hand, kept the presenting part high in the pelvis until a general anaesthetic had been administered. The membranes were then ruptured and a breech extraction was easily performed 25 minutes after the delivery of the first child. The second twin, a male, weighed 6 pounds 2 ounces. The placenta had to be removed manually. Both babies made satisfactory progress.

Case 4. The patient, a gravida-4, aged 36 years, was admitted to hospital as an emergency case 4 weeks before term. After a labour lasting 2¼ hours a male child weighing 3 pounds 7 ounces was born. Intravenous ergometrine 0·5 mg. was given with the birth of the anterior shoulder; a twin pregnancy was diagnosed as soon as this child had been delivered. Vaginal examination showed the second twin to be presenting as a vertex and the operator kept the presenting part high in the pelvis whilst a general anaesthetic was administered. The membranes were then ruptured and a male child weighing 3 pounds 12 ounces was delivered by forceps; the placenta was expressed quite easily. The first child made satisfactory progress but the second suffered from repeated cyanotic attacks for several days; the appearance of the second twin strongly suggested mongolism but this diagnosis had yet to be established.

Discussion. There was convincing evidence, said Dr. Russell, that intravenous ergometrine, provided it is given with the crowning of the foetal head or birth of the anterior shoulder, reduced the risk of post-partum haemorrhage and shortened the duration of the third stage of labour (Martin and Dumoulin, 1953). Certain drawbacks to its use had been noted. Grimes *et al.* (1948) and Priver *et al.* (1949) had reported side-effects such as nausea, headaches and vomiting, whilst Martin and Dumoulin noted a significant increase in the incidence of manual removal of the placenta. During the two years intravenous ergometrine had been used widely, but not routinely, in their hospital in the control of the third stage of labour, there had been 74 cases of twin pregnancy and 9 of these have been undiagnosed. As detailed, 4 out of the 9 patients were given intravenous ergometrine as the first baby was being delivered. One of the 8 babies died, and the death might at least in part have been caused by the strong uterine contractions which followed the administration of ergometrine. This drug was known to cause tonic contraction of the uterus and was therefore liable to interfere with placental circulation and so lead to foetal anoxia. As a result of the difficulty experienced in the delivery of the second twin in Case 2, a point was made in the later cases of not rupturing the second sac of membranes until we were in a position to carry out immediate delivery of the second twin. By conserving the sac of membranes there was less likelihood of the uterus contracting firmly down on the second twin.

If an undiagnosed second twin were lying transversely, the operator might well be faced with a difficult intrauterine manipulation where the uterus had contracted down firmly on the foetus. There might then be a risk to mother as well as child.

As far as he knew, concluded Dr. Russell, this was the first time attention had been drawn to this complication of the use of intravenous ergometrine.

References

Grimes, W. H., Bartholomew, R. A., Colvin, E. D., and Fish, J. S. (1948): *Sth. med. J.*, **41**, 980.

Martin, J. D., and Dumoulin, J. G. (1953): *Brit. med. J.*, **1**, 643.

Priver, M. S., Harris, J. M., Krohn, L., and Boros, H. H. (1949): *West. J. Surgery*, **57**, 586.

Discussion

Mr. S. Bender said that there was an erroneous impression that the prognosis for the second twin was adversely affected by an interval of more than one hour elapsing between the two deliveries. He suggested that, in the cases described, masterly inactivity rather than the rupture of the membranes, might have been a wiser and safer course.

Dr. D. C. A. Bevis said that deferring the intravenous injection until after the baby was completely delivered might obviate this complication by allowing the diagnosis of the second twin to be made in time.

Mr. D. C. Racker read a paper on

Human Relationships in Hospital

Although kindness to patients was something upon which all were agreed, its actual practice was often lacking because of thoughtlessness, which in turn was usually due to lack of experience. Consideration of patients' feelings was one of the last things which a doctor learned.

The attitude of the consultant was therefore all-important as from him the tone of the staff, medical and nursing was taken. The aim of our work, apart from the actual scientific procedures, should be to have a happy hospital in the fullest possible sense. On that all else depended.

Time would allow him to state but a few of the more important factors, and he hoped that all would be stimulated to review their conduct. He realized that he might sound smug and pontifical, but it was difficult to approach this subject without giving that impression. Nor did he always find it possible to practise all he preached.

Admission of the patient. The patient's first contact with a hospital moulded her future outlook. Therefore there should be a bright, cheerful admitting room where a patient's particulars can be taken without any undue wait, by a courteous, comely, pleasant nurse. It should never, in the case of women, be done by a porter as it often was in a hall with other people about. The patient

and relatives should then be escorted to the ward, where Sister or Staff-Nurse should be waiting to receive them, with some encouraging words, and make sure the relatives understand their privileges as regards visiting, etc.

Progress. Except where contra-indicated, e.g., malignancy, a patient should have her condition and its treatment simply explained to her by the consultant or registrar. Patients should have ample opportunity to discuss their progress with the doctor and should not question the nursing staff. Any investigations which might disturb a patient should be explained both as to purpose and method.

Many sensitive patients suffered when in a general ward from lack of privacy. Every effort should be made to help and one suggestion was curtains round all beds, which was also helpful for the nursing staff. Patients should always be allowed to go to the lavatory whenever possible.

In grave cases the consultant or registrar should make a point of interviewing relatives. Also a time should be set aside once a week for the consultant to be available to interview any relatives who wish to see him.

It was helpful to have a separate room for discharge where patients could have a final explanation as to progress and aftercare in privacy.

It is not always sufficient to explain to a patient what care they should take after discharge. It may be necessary at times to impress such care on relatives, particularly when these are unsympathetic to the patient. In the letter to the doctor advice can be given on such matters as home help when necessary and many other domestic matters.

Admission of unfavourable cases. Inoperable malignant cases should always be admitted whenever they cannot be nursed in comfort at home. This particularly applied to the relief of pain as many doctors found it difficult to call regularly to give injections of analgesics, which were useless orally if the pain was severe.

Relations with staff. The most important single factor which contributed to a patients' welfare was a happy hospital, which could only be obtained with a contented staff.

The consultant should know something of the background and future ambitions (aspirations) of his residents. He should take a personal interest in their training, encourage and advise them and form a judgment of their capabilities. A greater feeling of mutual confidence and trust between a consultant and his resident staff was desirable. It was equally important that residents should play their part and show keenness. It was very helpful if the interest of the nursing staff could be gained by giving them full responsibility whenever possible and letting them feel that their views were taken seriously. This was particularly important in obstetrics. There should be a monthly staff meeting of residents, maternity sisters and superintendents where everyone was encouraged to give their views, particularly the sisters and especially regarding lines of treatment and patients' welfare.

Suitable topics were management of the third stage of labour, infant nursing and the relief of pain in childbirth. It was the consultant's duty to set an example in the relief of pain to all patients for it was so easy for residents and nursing staff to become lax in this matter.

There was an obligation on medical members of committees to attend whenever possible, and not just when matters affecting them personally were under review. These committees should have more power and should decide questions regarding patients' welfare, hospital equipment, etc., and noone had more experience of patient's requirements than the medical and nursing staff. The main duty of the management committee should be to find ways of implementing the recommendations and decisions of the medical board. If they took on other functions and duties then they should also have the work and responsibility which went with it and should spend a great deal of time in the hospital at all hours. Members should be very conscious of the responsibility they have undertaken and should treat matters impersonally and not study their own self-aggrandizement.

In conclusion Mr. Racker said he had only touched the fringe of a large and vitally important subject, but if it gave food for thought it would have served its purpose.

Discussion

Mr. A. A. Gemmell agreed that admission to hospital should never be an ordeal for a patient. He drew the attention of the meeting to an informative and helpful pamphlet put out by the Ministry of Health entitled "Care of the Inpatient".

Mr. F. Stabler doubted the wisdom of free discussion of medical aspects with patients and relatives as it often increased rather than decreased their worries and fears. The divine inspiration of how to handle patients kindly and correctly could not be taught.

Mr. Wigley emphasized that patients should know how to treat their doctors too.

Mr. Racker replied.

NORTH OF ENGLAND OBSTETRICAL AND GYNAECOLOGICAL SOCIETY

March 1954

A Meeting of the North of England Obstetrical and Gynaecological Society was held in the Jessop Hospital for Women, Sheffield, on 19th March, 1954, with the President, Dr. K. V. Bailey in the Chair.

Mr. S. Bender described a case of

Pregnancy Following Pelvic Tuberculosis

At a time, said Mr. Bender, when the results of treatment of genital tuberculosis in the female with streptomycin and similar agents were still the subject of research, the following case might be of interest if not of significance.

Case History

A woman of 26 was first seen in February, 1952, on account of primary sterility of 2-years' duration. She had had swollen glands in the neck when 13 but her mother was adamant that this was not a tuberculous condition. As pelvic examination was negative and analysis of her husband's semen was satisfactory, she was given general advice and asked to return in 3 months if not pregnant. In July, 1952 as she was still infertile she was admitted to hospital. Chest X-ray was negative. Examination under anaesthesia revealed no abnormality and tubal insufflation was positive at a pressure of 140 mm. Hg. Endometrial biopsy showed foci of tuberculosis and this diagnosis was confirmed when culture and guinea pig inoculation were both reported positive. A 60-day course of streptomycin 1 g. daily and P.A.S. 18 g. daily was given with no reaction, ending in mid-December, 1952.

The following month the patient complained of an occasional ache in the right iliac fossa, which she attributed to a grumbling appendix, but vaginally the right appendage was slightly enlarged and tender. Three months later it still felt somewhat enlarged but was no longer tender. Re-X-ray of her chest at this time was negative.

In mid-August, 1953 she reported that her last menstrual period had started on 6th July and that she had some symptoms of early pregnancy. A week later there was a little pain in the left iliac fossa and a small amount of brown vaginal discharge. She was admitted to hospital for observation for a week. Vaginal examination was made to exclude an ectopic pregnancy but no left appendage swelling was made out; she was, as usual, very constipated. The Hogben test was positive.

During the following 6 weeks when she was at home she had a slight intermittent brown discharge but, for fear of abortion, she was not examined again vaginally until early October. It was then obvious that she had a left tubal ectopic pregnancy.

This was confirmed at operation on 10th October, 1953 when, as her right tube was also thickened, dilated and blocked, the uterus, both tubes and the left ovary were removed. The patient was very disappointed to have lost her uterus but the endometrium, now practically undisturbed for 3 months, showed a most florid tuberculosis between the secretory glands. Both tubes showed tuberculous salpingitis, and chorionic villi were also seen in the left tube.

Comment

Ectopic Pregnancy in a Tuberculous Tube. In 1951 Kistner *et al.* reported what they reckoned to be the 42nd reported case of this combination. They omitted to include a case described by Bevis in 1948, a case which, like that of Pink (1944), was remarkable because the other tube had previously been the site of an ectopic pregnancy. Since 1951 other cases of this condition had been described by Sutherland and Garrey (1951), Bédrine and Houlné (1952) and Cope (1952).

Almost invariably, said Mr. Bender, it was the ectopic pregnancy which was diagnosed or suspected preoperatively, the tuberculous salpingitis being found only on histological study of the excised tube. In one case, as yet unreported, seen in the Liverpool Royal Infirmary by Professor T. N. A. Jeffcoate in 1951, the reverse occurred; the operation was carried out for what was thought to be an exacerbation of a previously proved tuberculous infection and the ectopic pregnancy was an unexpected finding at laparotomy at which the presence of tuberculosis was confirmed.

Pregnancy after Medical Treatment of Bacteriologically Proved Genital Tuberculosis

Rabau (1952) and Barns, Smith and Snaith (1953) each described one case of a woman with endometrial tuberculosis diagnosed by a single bacteriological test, but not confirmed histologically, and treated with streptomycin and other drugs, in whom pregnancy subsequently occurred. However abortion occurred in Rabau's case at 3 months and in the other at 6 months. Stallworthy (1953) also reported one case of pregnancy after similar treatment but the outcome was not yet known. Bédrine and Houlné (1952) reported a tubal pregnancy after treatment with streptomycin and P.A.S. for an infection proved by biopsy and culture, and another case of intrauterine pregnancy which aborted at 6 weeks. Herring and King (1950, 1952) provided the only report of a case in which the diagnosis was proved both histologically and bacteriologically, streptomycin was administered, and the woman subsequently had a successful intrauterine pregnancy.

The case now described appeared to be the first to be reported in which treatment of proved genital tuberculosis with antibiotics was followed by pregnancy, *and the tuberculous condition was proved to be still present.* It therefore illustrated the difficulty of proving cure in any woman treated for genital tuberculosis unless the uterus and appendages were removed and shown by histological and bacteriological methods to be free from infection. Some might argue that a successful intra-uterine pregnancy was proof of cure but the finding of genital tuberculosis immediately post-partum by Sutherland (1952a) and others casts doubt on this.

This case also demonstrated the uncertain results of the treatment of gynaecological tuberculosis with antibiotics. This uncertainty was evident in the follow-up report of Sutherland (1952b) that 3 of 10 cases "relapsed" within a year of the completion of treatment; it was also voiced by Barns, Smith and Snaith (1953) who found that "relapse" might occur more than a year after treatment.

While, therefore, enquiry into the value of streptomycin and other drugs in various combinations and dosages in these cases must be continued, at present, and except possibly as an adjunct to surgery, they offered no certain prospect of cure. Moreover, their scientific use, involving the patient as it did in the repetition of endometrial biopsy every few months for an undefined period of years, must be a constant reminder to the woman both of her infirmity and of the doubt as to its cure.

REFERENCES

Barns, T., Smith, H. G. M., and Snaith, L. M. (1953): *Lancet*, **1**, 817.

Bédrine, H., and Houlné, P. (1952): *Bull. Féd. Soc. Gynéc. Obstét.*, **4**, 280.
Bevis, D. C. A. (1948): *J. Obstet. Gynaec. Brit. Emp.*, **55**, 505.
Cope, E. (1952): *Proc. R. Soc. Med.*, **45**, 327.
Herring, J. S. (1952): *Amer. J. Obstet. Gynec.*, **64**, 710.
Herring, J. S., and King, J. A. (1950): *Amer. J. Obstet. Gynec.*, **60**, 925.
Kistner, R. W., Hertig, A. T., and Rock, J. (1951): *Amer. J. Obstet. Gynec.*, **62**, 1157.
Pink, H. A. (1944): *Amer. J. Obstet. Gynec.*, **48**, 427.
Rabau, E. (1952): *J. Obstet. Gynaec. Brit. Emp.*, **59**, 743.
Stallworthy, J. (1953): Personal communication.
Sutherland, A. M. (1952a): *Proc. R. Soc. Med.*, **45**, 411.
Sutherland, A. M. (1952b): *J. Obstet. Gynaec. Brit. Emp.*, **59**, 738.
Sutherland, A. M., and Garrey, M. M. (1951): *Glasg. med. J.*, **32**, 738.

Discussion

Mr. C. R. Macdonald said that he had seen a woman in whom tuberculous endometritis had been diagnosed bacteriologically and histologically, and in whom treatment with streptomycin and P.A.S. for 6 weeks had been followed in 2 years time by a normal pregnancy.

Dr. C. H. Walsh had seen a case of ectopic pregnancy in a tuberculous tube. Despite antibiotic treatment, she had not conceived again. He was impressed with the response of tuberculous appendage masses to medical treatment. Professor W. I. C. Morris recounted the story of a woman who was found to have a tuberculous mass in the left iliac fossa a week after Caesarean section.

In reply, Mr. Bender recalled that at least one tube was found patent in about 40 per cent of cases of tuberculous salpingitis, that in puerperal cases the genital tuberculosis was probably blood borne and not antedating the pregnancy and that it was advisable to submit curettings from every case of sterility for bacteriological examination.

Mr. Bryan Williams described

TWO CASES OF SLIPPERY ELM CALCULUS IN PREGNANCY

(This article appears on page 499 of this issue)

Discussion

Mr. C. J. K. Hamilton had seen 4 such cases. If slippery elm was made available only in powder form it would prevent its use as an abortifacient and complications such as these.

Mr. C. H. Walsh told of a woman who delivered triplets one month after a piece of slippery elm was removed from the bladder by dilatation of the urethra.

Professor C. Scott Russell showed a film of

PLASTIC ENLARGEMENT OF THE VAGINAL INTROITUS

The operation depicted, using skin flaps, was devised by a plastic surgeon colleague Mr. Hynes, who joined in the subsequent discussion which centred on the selection of suitable cases for the operation.

Dr. E. M. O'Dwyer delivered a paper on

THE INFLUENCE OF STATURE ON PELVIC SHAPE AND THE COURSE OF LABOUR

Dr. O'Dwyer said that his paper was based on the labours of 1,479 Jewish primigravidae, other than private patients, of known height, who were confined at the Bearsted Memorial Hospital during the years 1948-52. Of these, 409 were over 5 feet 3 inches in height ("tall" group), 738 were between 5 feet and 5 feet 3 inches ("average" group) and 332 were less than 5 feet tall ("small" group). Each patient was weighed at her first visit to the antenatal clinic, usually about the 10th week, and any reference to maternal weight later would refer to that recorded at the initial visit. In each case the pelvis was examined bimanually at the 37th week, X-ray pelvimetry being reserved for those in whom pelvic examination was unsatisfactory or had failed to exclude disproportion, although it was used occasionally in people of small stature where the foetal head remained free at term in spite of an apparently adequate pelvis. In no case was labour induced because of borderline disproportion.

X-ray Pelvimetry

One hundred and fourteen radiographs of the pelvic brim were examined after the method of Nicholson and Allen (1946). By correlating the brim or pelvic index (Turner, 1886) with the sagittal index—the percentage ratio of the posterior sagittal to the conjugate diameters—they described four basic shapes of the pelvic brim corresponding to the four parent types of Caldwell's and Moloy's (1933) classification. In the Nicholson and Allen (1946) classification a flat pelvis was one with a pelvic index of 81 per cent or under and a narrow pelvis one with a pelvic index of 104 per cent or over, irrespective of the sagittal index. Of the remainder, all pelves with a pelvic index between 81 and 104 per cent and a sagittal index of 30 or under were of the scutiform type, the rest being round.

Among a predominantly rural population, Nicholson and Allen (1946) found that approximately 70 per cent of all pelves were round, with the remainder evenly distributed among the other three groups. Caldwell, Moloy and D'Esopo (1940) however, in a series of patients of white and negro stock, found only 4 per cent platypelloid pelves, though the android type was observed in 18 per cent of cases.

Of the radiographs examined in the present series only 15 were of tall women, 54 were of patients of average height and 45 of women under 5 feet in height. The outstanding feature was the very high incidence (33 per cent) of flat pelves among the small women and the almost complete absence of the scutiform or android pelvis throughout the series. While there was no significant difference in the percentage of narrow pelves in the different height groups, each increase in height resulted in a marked increase in the number of round pelves, the same being true of the mean brim index and to a lesser extent of the mean conjugate diameter.

The results were in accord with Bernard's (1952)

findings in a series of 100 tall (over 5 feet 6 inches) and 100 small (under 5 feet) women in Aberdeen. Although 34 per cent of small women had flat pelves there was only 1 scutiform pelvis in his entire series, which suggested that the true android pelvis was much rarer than was generally believed.

Kenny (1944) on the other hand, examined X-ray pelvimetries in 48 out of a total of 317 Jewish obstetric patients and found that all 48 pelves were gynaecoid in type despite an obese stocky build, hirsuties and other features of the dystocia-dystrophia syndrome. All 317 patients had spontaneous deliveries apart from 1 Caesarean section and 4 low forceps extractions.

Greulich and Thoms (1939) compared the pelves of a group of student nurses, drawn from a high social level in America, whose average height was 5 feet 5 inches, with those of general clinic patients, of average height 5 feet 2 inches, and found that 80 per cent of the former were round or anthropoid as against 60 per cent of the latter. From this they concluded and Bernard (1952) agreed, that while some women were "genetically" small, small stature and pelvic contraction were most often the results of poor environment during childhood. Rickets and other disorders of nutrition were rare among Jewish children, and the fact that the patients in the present series belonged for the most part to the Registrar General's Social Classes II and III (skilled workers) and therefore were likely to have grown up in a satisfactory environment—though some admittedly were refugees from Europe—indicated that smallness, so far as Jewish women are concerned, was of genetic rather than environmental origin. The complete absence of the android pelvis among Jewish women, though it was observed in 203 (21 per cent) non-Jewish women (Kenny, 1944), further supported the view that an hereditary factor was involved. But whatever the cause, one-fifth of all Jewish women were under 5 feet in height and of these one-third had flattening of the pelvic brim.

Effect on Labour

If differences in height, continued Dr. O'Dwyer, could so influence pelvic shape, they should have a corresponding effect on the course of labour and this was evidenced in his series by the increased dystocia associated with smallness of stature. In the present series labour was prolonged beyond 48 hours in 4 per cent of cases and twice as commonly among women under 5 feet as in those over 5 feet 3 inches in height.

Minor degrees of cephalopelvic disproportion, to which greater significance in the aetiology of abnormal uterine action was now attached, were probably responsible to some extent for the high incidence of inertia among the small women, though the duration of labour was greatly influenced by two variable factors, maternal and foetal weight.

Taking the series as a whole, 58 per cent of the patients weighed more than 9 stones and 33 per cent more than 10 stones at the first antenatal visit. Of those under 5 feet in height 40 per cent were over 9 stones in weight and 18 per cent over 10 stones. Allowing for the subsequent weight gain during pregnancy it would be appreciated how frequently relative obesity was encountered at term. The incidence of prolonged labour in 199 small women under 9 stones in weight was 4 per cent compared to 12 per cent for 133 small women over 9 stones in weight and 15 per cent for 61 small women over 10 stones in weight.

The average weight of the baby was 6 pounds 11 ounces in the case of women under 5 feet and 7 pounds 1¼ ounces in those over 5 feet in height. Provided the infant's weight did not exceed 8 pounds the inertia incidence was within normal limits; where it was greater than 8 pounds, however, the incidence of prolonged labour was of the nature of 9 per cent for the whole series and 26 per cent for the "small" group.

Forceps Deliveries

Forceps were applied on 176 occasions (12 per cent). Here again the influence of stature was evident, the incidence rising from 11 per cent for tall women to 17 per cent for small women. While posterior positions of the occiput and transverse arrest of the head were the commonest indications for forceps delivery at all heights, they were responsible for 50 per cent of the forceps in women under 5 feet in height. Weight too was important: in 199 small women under 9 stones in weight the forceps incidence was 12 per cent as against 24 per cent in 133 small women over 9 stones in weight and 30 per cent in 61 over 10 stones in weight. A similar trend was observed with respect to foetal weight, the incidence rising from 9 per cent for babies weighing under 6 pounds to 40 per cent for those over 8 pounds.

There was 1 maternal death in the series—a difficult mid-forceps delivery following prolonged labour, in a patient 5 feet 4 inches tall, of a stillborn baby weighing 9 pounds 10 ounces. Altogether 2 stillbirths occurred in the tall groups, 4 stillbirths in the intermediate group and 1 stillbirth and 1 neonatal death in the small group.

Caesarean Section

Thirty-one patients (2 per cent) were delivered by Caesarean section. Section was required twice as often in patients under 5 feet in height as in either of the other two groups. There were 7 Caesarean sections among small women for cephalopelvic disproportion (4 of them after failed trials of labour), 3 in women of average height and 2 in the tall group.

There was no maternal death and no stillbirth, but 1 neonatal death occurred as a result of intracranial haemorrhage following Caesarean section for prolonged labour, in a patient 5 feet 1 inch in height.

Overall Results

There was 1 maternal death. Nine stillbirths occurred in the group of small women, 13 in the intermediate group and 7 in the tall group, the stillbirth rate (per 1,000 total births) being 27·0, 17·6, and 17·0 respectively.

There were 3 neonatal deaths in the small group, 5 in the intermediate and 2 in the tall group, giving a neonatal death rate (per 1,000 live births) of 9·2, 6·9, and 5·0 respectively.

Discussion

Although smallness of stature was common among Jewesses, said Dr. O'Dwyer, they would appear to have no specific pelvic shape, the findings in this survey being similar to Bernard's (1952)—the only comparable one with regard to height. The fact that there were a lot of flat pelves in this series and that Kenny (1944) found none in another Jewish series is probably due to differences in height, no record of this having been made in her series. In fact, the only positive finding which emerges from the whole work in this respect is that the height question is the most important, although the size of the baby is of comparable value. If one accepts that there was probable disproportion in those cases where forceps were applied for occipito-posterior and deep transverse arrest of the head and includes cases of Caesarean section for disproportion, the incidence of cephalopelvic disproportion is 10 per cent for women under 5 feet tall as against 4 per cent for all others, which goes to show the increased risks of labour in small women. However, provided the baby is not too large and the mother not so obese that the pelvis is "cushioned" with fat, smallness of stature does not exercise such an adverse effect on the course of labour.

REFERENCES

Bernard, R. M. (1952): *Edinb. med. J.*, **59**, *Trans. Edinb. obstet. Soc.*, 1.

Caldwell, W. E., and Moloy, H. C. (1933): *Amer. J. Obstet. Gynec.*, **26**, 479.

Caldwell, W. E., Moloy, H. C., and D'Esopo, D. A. (1940): *Amer. J. Obstet. Gynec.*, **40**, 558.

Graulich, W. W., and Thoms, H. (1939): *J. Amer. med. Ass.*, **112**, 485.

Kenny, M. (1944): *J. Obstet. Gynaec. Brit. Emp.*, **51**, 277.

Nicholson, C., and Allen, H. S. (1946): *Lancet*, **2**, 192.

Turner, W. (1886): Report on scientific results of the voyage of *H.M.S. Challenger*. London. Vol. 16, p. 47 (quoted by Nicholson and Allen (1946)).

Discussion

The President thought that the trunk height rather than the total height of the woman might be the important factor in relation to stature. Professor C. S. Russell said that no tests for significance had apparently been applied to the various figures given. The conclusion to be drawn from this paper seemed to be—watch out for dystocia in the woman who is small, or obese, or has a big baby.

Dr. O'Dwyer agreed with this.

FOURTEENTH BRITISH CONGRESS OF OBSTETRICS AND GYNAECOLOGY, OXFORD

President, Professor J. Chassar Moir, F.R.C.O.G.

Hon. Secretaries, J. Stallworthy, F.R.C.O.G., W. Hawksworth, F.R.C.O.G.

THE Congress will be held in the Examination Schools, Oxford, from the 27th-30th July, 1955.

The Scientific Programme and opening speakers will be:

WEDNESDAY, 27TH JULY (MORNING AND AFTERNOON)

Opening Address "Intermezzo". Emeritus Professor R. W. Johnstone, Edinburgh.

"The Treatment of Imminent Eclampsia." Professor R. J. Kellar, Edinburgh.

"Accidental Haemorrhage (Abruptio Placentae)." Professor Gordon Douglas, New York.

THURSDAY, 28TH JULY (MORNING ONLY).

"The Place of Radiation Therapy and of Surgery in the Treatment of Uterine Cancer." Dr. H. L. Kottmeier, Stockholm.

FRIDAY, 29TH JULY (MORNING AND AFTERNOON)

"The Role of the Midwife, the Family Practitioner, and the Specialist in Normal Labour." Professor J. MCKELVEY, Minneapolis; Mr. ARNOLD WALKER, London; Dr. J. Abercrombie, London.

"The Treatment of the Non-Malignant Unhealthy Cervix." Mr. Charles D. Read, London.

"The Conduct of Delivery following Pelvic Floor Repair." Dr. J. W. Hunter, Manchester.

A Panel of Invited Members will answer questions arising from the afternoon's papers.

SATURDAY, 30TH JULY (MORNING ONLY)

"Recent Advances in Hystero-Salpingography and Angiography in Gynaecological Diagnosis." Dr. Olof Norman, Lund.

An additional subject may be arranged, and facilities will be available for showing scientific films.

The Warden has kindly granted the use of Rhodes House to the Congress. Social activities will include a Reception at Blenheim Palace by invitation of Their Graces the Duke and Duchess of Marlborough. The Congress Banquet will be held in Christ Church Dining Hall.

Membership Fees are:

Full Membership	£4	4*s.*	0*d.*
Associate Membership	£2	2*s.*	0*d.*
One day Membership	£1	1*s.*	0*d.*

Full Membership is open to all. Associate Membership is reserved for Registrars and House Officers and entitles them to attend the Scientific Meetings *only*.

Registrations and fees are now being accepted and further details of the Congress and accommodation available will be supplied on application to the Congress Secretaries, Radcliffe Infirmary, Oxford.

BOOK REVIEWS

"Lehrbuch der Geburtshilfe." Edited by Prof. Dr. TH. KOLLER (Basle), Prof. Dr. E. HELD (Zurich), and Prof. Dr. W. NEUWEILER (Berne). 2nd edition. Pp. xix+907, 348 illustrations. S. Karger, Basle, 1953. Price 62.40 Swiss francs.

THIS work is volume 2 of a trilogy (edited by Anderes, Guggisberg and Koller), the first being devoted to Gynaecology and the third to Obstetrical Operations.

In the present edition the editors have actually succeeded in shortening the text, firstly by the way in which the numerous authors have been prepared to omit much of the theory to the advantage of the more important practical aspects of the subject (this none of us will regret) and secondly, by the omission of the excellent historical section by Dr. H. Beuss (which both editors and readers must surely miss). The book must be regarded as large, particularly when it is remembered that operative obstetrics are not included.

One of its attractive and practical features is the extensive table of contents, for under the chapter headings are the headings of all subsections. This makes for easy reference and study.

Almost one-third of the book is given to the development of the foetus, the newborn child, normal pregnancy, normal labour, the third stage and its management, the puerperium, twin pregnancy and breech birth. These are all adequately covered and frequently in much detail. We only notice a few points. Spanner's conception of placental structure is accepted; Goerttler's arrangement of the uterine musculature is fully explained and illustrated; morphia is favoured as an analgesic; chloroform, "à la reine" and not in an amount which will cause complete loss of consciousness, is given pride of place; nitrous oxide is well received; pudendal anaesthesia (Novocain 1 per cent) is described and its great value rightly stressed. The aetiology of breech presentations is fully dealt with, the necessity for manual assistance after the birth of the umbilicus is emphasized, but on the prevention of this form of delivery nothing is said. Possibly this is because external version must be reserved for the operative volume; albeit it would seem (though he may not intend it) that the author feels that it is from a greater use of Caesarean section that the present foetal mortality might be lowered (p. 296).

Under the Pathology of Pregnancy, Held outlines the general treatment of eclampsia, favours Stroganoff with chloroform for the fits, but admits that in recent years intramuscular luminal and magnesium gluconate have given him good results. Under abnormal labour eclampsia is again considered by Koller. In eclampsia after 34–36 weeks, it may sometimes be advisable to perform Caesarean section 48 hours after the last fit. In other cases, if the second stage of labour is reached with a still living child, operative delivery is desirable; after delivery Stroganoff's method is pursued.

In the treatment of uterine inertia, quinine, pituitrin, thymophysin, morphia, are all suggested. Something might have been said of the "pituitary intravenous drip"; however if this is an omission, mention of the curative value of artificial rupture of the membranes can be regarded as compensatory. An excellent account of the use of oxytocics in abortion, induction of labour, in cases of intra-uterine death of the foetus, in premature rupture of the membranes and in uterine inertia is given by Koller in his section on abnormal labour.

Malpresentations and their management are an interesting and attractive section of the book. In shoulder presentation it may be an ideal course to wait until full dilatation has occurred and then to perform version and extraction. It may not always be safe, however, and the course recommended (p. 502) might benefit from a little clarification. Nevertheless, Koller makes the important point that when the foetal heart is absent it is probably safe to assume that so much retraction of the uterus and placental site has occurred as will make version very dangerous; decapitation is then the method of choice. In the section on delay in the two stages of labour some reliance and value is placed on the counting of the pains (Frey) though Koller is careful to stress that this is only an adjunct and is no substitute for a careful and complete evaluation of all the factors in each individual case. It would seem that "deep transverse arrest" can in most cases be relieved by manual rotation of the occiput to the front: forceps delivery is indicated when, after a further passage of some 4–5 hours, no progress has been made. In this country the two procedures would be reduced to one act.

The treatment of "the haemorrhages" is in keeping with modern trends. In placenta praevia the dangers of vaginal examination are duly noted, the advantages of expectant treatment in suitable cases are stressed, and, except in unusual circumstances, the treatment recommended is abdominal delivery or simple rupture of the membranes—the latter being reserved for minor cases. A section on the radiological diagnosis of low implantation of the placenta will surely appear in future editions. Caesarean section is given a greater part in the management of premature separation of the normally implanted placenta than it has held, at least heretofore, in British practice.

Reist gives an excellent account of the disturbances of micturition in the puerperium. The account of puerperal infections is good but has, as it must in almost every obstetric book, a rather old world appearance in view of modern therapy and prophylaxis.

Fifty-eight pages are devoted to foetal malformations, perhaps a little more than many of these monsters deserve. Pathological conditions of the newborn receive from Willi an almost equal space—i.e., one-tenth of the book goes to these two problems. In the section by Willi

the "Rh- triad" (hydrops, icterus gravis and haemolytic anaemia) is described in three pages; these observations might usefully have been combined with the text on pp. 384–387 and, with other scattered references throughout the book, extended to a chapter dealing solely with the Rh factor and its implications in modern obstetrics.

Some observations and minor criticisms have been offered upon what, taken as a whole, must be judged an outstanding and most informative work. The illustrations and photographs are beautifully reproduced. The discussions on treatment are always valuable and never dull, and the editors and their contributors must be congratulated on a work which should appeal to all who read German easily. It is a volume obviously designed to appeal to the specialist, the teacher, the undergraduate and even to the midwife. There is no doubt it will continue to play a great part in the education of all four over a large area of Western Europe.

C. McIntosh Marshall

"Diseases of Women." By ROBERT J. CROSSEN, A.B., M.D., F.A.C.S. 10th edition. Pp. xiii+935 with 990 illustrations. Henry Kimpton, London, 1953. Price £6 15*s*.

THIS book first appeared, written by Dr. H. S. Crossen, in 1907 and the succeeding editions in themselves afford a history of the development of gynaecology during the first half of this century. The most recent revisions and additions include sections on the embryology and physiology of the ovary, with special reference to the part played by its vasculature; the cyclic histochemical changes in the cells of the endometrium and of the ovarian follicle; the value of vaginal cytological studies; and cancer of the uterus. The psychosomatic aspects of gynaecology are considered in proper perspective. The illustrations out-number the text pages and their high quality is due to the author's policy of obtaining from any source the illustration he considers best suited to demonstrate each particular point.

There is little at which the reviewer can cavil. The book is very up-to-date, but stress incontinence is dealt with summarily and without reference to recent relevant research carried out in this country. Contemporaries of Blair Bell will be shocked to see that the reference to transplantation of ovarian tissue to the rectus muscles is from the U.S.A. and is dated 1950. There is the unexpected absence of a chapter on abortion, but there is the welcome presence of a section on medicolegal points in gynaecology. Details of operative techniques are not included, the reader being referred for these to a companion volume by the same author.

This is a comprehensive and detailed textbook eminently suitable for the postgraduate scholar and the consultant, but every student and practitioner would benefit from reading the 50 pages devoted to the techniques of abdominal and pelvic examinations. This tenth edition is the first for which Dr. R. J. Crossen has been solely responsible and it continues to combine erudition, lucidity and wisdom in unusual fashion.

"Textbook of Obstetrics." By JOHN F. CUNNINGHAM, M.D., M.A.O., F.R.C.P.I., F.R.C.O.G., Professor of Obstetrics and Gynaecology, University College, Dublin. 2nd edition. Pp. x+499, with 298 illustrations. William Heinemann, London, 1954. Price 40*s*.

THIS textbook of obstetrics is intended for the student who wants more than the bare bones and for the general practitioner who wants a practical but not too synoptic reference book. For this second edition the chapters on ante-partum haemorrhage and abnormal uterine action have been rewritten and to good effect, but the section on postmaturity might be enlarged in the next revision, for the diagnosis and management of this condition often bedevil the practitioner. In addition, some might prefer more critical evaluation of such points mentioned as the use of dihydroergotamine in hypertonic uterine action, the place for Caesarean section in heart disease and the relevance of ABO incompatibility in the aetiology of abortion.

The English is sometimes more vivid than grammatical, and the heading "What to look for on rectal examination" might even qualify as an Irishism. But the teaching is clear and succint, and, although mention is made that the methods practised are in accordance with the ethics of the Roman Catholic Church, other viewpoints are recorded. It is to be expected that symphysiotomy is discussed in more detail than in most textbooks of this size, but is this operation really safer in a prolonged labour after failure of forceps due to disproportion than is lower segment Caesarean section?

"Lehrbuch der Gynäkologie." By PROF. DR. MED. HEINRICH MARTIUS. 3rd edition. Pp. xiv+414 and 446 illustrations. Georg Thiem, Stuttgart, 1953. Price D.M. 49.80.

THE covers of this textbook seem to enclose something more than the title would suggest; they embrace a professor and his experience, a teacher and his audience, indeed a man and his book. Professor Martius has for many years been the Director of the Universitäts-Frauenklinik in Gottingen. His gifts as a teacher are probably unequalled in Germany today. His distinguished contributions to gynaecology in that country were deservedly recognized when he was elected President of the first postwar Gynaecological Congress at Bad Pyrmont in 1951. The book is somewhat longer than it would appear for the pages are larger and the type slightly smaller than those of the average English textbook. The illustrations are excellent and many are in colour. Clarity is never sacrificed to a desire for artistic perfection. Operative technique is not covered in this volume; only the underlying principles are set out. Italian and Spanish translations of the work have already been completed.

The early chapters include an excellent introduction on the patient and case-taking, and sections on the disturbances of menstruation and the symptoms and management of the climacteric. A useful chapter on vaginal discharges is followed by a concise account of the "pathological atrophies and hypertrophies in the female

reproductive organs". Under this heading are considered, among other things, pruritus, leukoplakia, kraurosis, and finally, endometriosis. In their management the place of hormones is soberly and cautiously set out. As Martius is careful to stress, we have not yet reached the stage when hormone therapy can be regarded as a true substitution-therapy. Subcutaneous injections of alcohol can give most satisfying results in certain cases of pruritus vulvae.

The chapter on Endometriosis is extremely well done and the places of surgery, radiotherapy, and hormone therapy are given a wise and nicely balanced consideration. When surgery is resorted to it is not always possible or safe to extirpate all the lesions, nor indeed is it always necessary to do so in order to relieve the symptoms. He recommends that surgery in younger people be restricted mainly to the extirpation of chocolate cysts of ovaries, removal of easily accessible nodules in the pouch of Douglas, and ventrosuspension of the uterus after breaking down the adhesions which have resulted from rectovaginal endometriosis.

The longest chapter is devoted to Tumours. This is the highlight of the book. Here is clinical and descriptive writing at its very best and these pages alone would single out Martius as one of the leading gynaecological teachers of the present time. Outstanding is the section on carcinoma of the cervix which calls us all to our responsibilities and the importance of early diagnosis. No student can forget the clinical progress of this disease if he thinks of the four periods into which Martius divides it—the symptom-free, the symptom-poor, the symptom-rich, and the terminal period of pain and desolation. Martius is not only a surgeon, he is a radiotherapist in his own right, and both lines of treatment are fairly considered. With regard to carcinoma of the vulva he notes first the swing from rational (excision with inguinal lymphadenectomy) to the ultra-radical surgery of Kehrer and Stoeckel (the addition of hypogastric lymphadenectomy) and the failure to secure by the latter any essential improvement in the final results. He is convinced that at the moment, wide local excision with the diathermy knife, and X-radiation of the tumour bed and the inguinal regions are the best hope. When certain technical difficulties have been overcome he thinks that high-speed electron therapy will soon prove to be another great advance in the treatment of this condition. The treatment of ovarian tumours and uterine fibroids are models of clinical exposition.

Inflammatory processes in the pelvis are dealt with at great length. Genital tuberculosis and its therapeutic problems are fully discussed in the light of all recent knowledge.

The chapter on Infertility contains all the generally accepted knowledge. But Martius always has something of additional interest to add and he describes (pp. 344 and 345) how an intense desire to become pregnant may not only defeat its own ends but give rise to definite psychological and bodily ills. The dangers of insufflation and salpingography are stressed. The woman should always be hospitalized. Because of the possible effects on the ovaries and the risk of arousing recessive mutations, radiological investigations should be kept within safe limitations. In ten commandments Martius expounds the rules which will ensure the safety of these investigations, and they are worth the consideration of beginners and experienced alike.

The tenth and final chapter is on Gynaecological Orthopaedics. First it must be noted that in relation to her architectural and static features the female has a lower "functional capacity". This has a phylogenetic explanation—woman, in view of her reproductive functions has not been able to acquire with the assumption of the upright position the same degree of mechanical stability which the male was able to assume. Further, once the male has passed beyond the period of growth his stability is fixed once and for all. In the female, on the other hand, periodic fluctuations occur and with each reproductive act and indeed with each menstrual period, alterations take place not only in all her tissues but particularly in the joints of the pelvic girdle, in the lower part of the thoracic cage, in her abdominal capacity, and in the curvatures of the spine. On such observations Martius builds up a most valuable account, not only of certain specific lesions (sacralization, lumbalization, spondylolisthesis, coccydynia) but offers a rational explanation of the backaches and pains which may result, among other things, from lassitude and exhaustion, from pendulous abdomen, or even from "fallen arches". The whole chapter is a red light against the too common assumption that the cause of "painful women" will invariably be found in their pelvic viscera. It is the kind of chapter we would expect from one who has already written a very successful monograph on low backache in women.

Most of the truly valuable German works are far too encyclopaedic for the question of translation ever to arise. This, however, is a work which would be amenable to such treatment, and should a British or American translation ever appear we do not think it would be neglected either by undergraduates or postgraduates.

Author, artists and publishers are to be congratulated on the appearance of such an attractive volume.

C. McIntosh Marshall

"An Atlas of Pelvic Operations." By LANGDON PARSONS, M.D., and HOWARD ULFELDER, M.D. Illustrated by MILDRED B. CODDING, A.B., M.A. Pp. vii+231. Illustrations 1,327. W. B. Saunders & Co., London, 1953. Price 90*s*.

THIS outstanding example of the effective integration of word and drawing is dedicated to Dr. J. V. Meigs, M.D., and is regarded by the authors as a product of the school of gynaecological surgery which he has developed in Boston, U.S.A. The art of surgery cannot be taught by word and diagram alone but this book undoubtedly provides a solid foundation on which the apprentice or indeed the fully-fledged gynaecologist can build by practical observation and experience.

It is divided into three major sections which are devoted to abdominal operations, vaginal and perineal operations, and operations for malignant disease. These sections are subdivided appropriately into chapters each

of which opens with a résumé of the indications for operation and discusses pre-operative and post-operative management, as well as operative techniques. All the standard procedures in common use are described and illustrated in a word-picture sequence which is exceptionally easy to follow. Of special interest to the gynaecologist are the chapters on operations involving the intestine, including intestinal resections, entero-anastomosis, colostomy and haemorrhoidectomy; operations on the urinary tract including uretero-anastomosis; and operations on the abdominal wall including all types of hernia.

Meigs's name is so often associated with radical pelvic surgery for malignant disease that a major section on this subject is to be expected. It deals particularly with radical excision of the vulva, uterus and rectum and lymphadenectomy and is included by the authors more as a warning than as encouragement to the inexperienced and to emphasize the immense difference in scope and magnitude of these operative procedures from those used in the treatment of benign diseases.

Some may quibble over certain anatomical and technical details but the work taken as a whole is of a high standard and should have a wide appeal.

"Pelvic Relaxations and Herniations." By JAMES M. WILSON, M.D. Pp. ix+64. With 35 figures. Charles C. Thomas, Springfield, Illinois, U.S.A., and Blackwell Scientific Publications, Oxford, 1954. Price 20*s*.

THIS slim volume of the American Lecture Series is intended to present a clinical rather than academic basis for understanding the architectural changes which occur in prolapse and the principles governing its treatment.

The first seven of the ten chapters, which are well written and clearly illustrated, deal with normal anatomy and the changes which occur in the various clinical types of vaginal and uterine prolapse. There is also an excellent account of the operation of episiotomy. Posterior vaginal hernia or enterocele is the only type of pelvic hernia described which is of any clinical importance. Two chapters are, however, devoted to levator hernia and to obturator hernia, sciatic hernia and hernia into the broad ligament, subjects which are of no more than academic interest even to the specialist. It is also surprising to find only four very short uninspiring paragraphs on symptomatology in the whole of the 64 pages. Yet symptoms provide the main guide to treatment.

There is much of interest to the British student, but most of which he will find in the standard textbooks.

"The Practical Management of Pain in Labour." By W. D. WYLIE, M.A., M.B., M.R.C.P., D.A. Pp. xii+148, with 42 illustrations. Lloyd-Luke, London, 1953. Price 18*s*. 6*d*.

DR. WYLIE has written a practical account of modern methods of relieving pain in normal and abnormal labour. After a fairly comprehensive description of agents and apparatus, guidance is offered regarding the most suitable approach to the individual case. There is a most helpful section on analgesia and anaesthesia for women with cardiac and pulmonary disease, although not all will agree with the statement that it is wise to allow some bleeding with delivery in patients with heart disease. The techniques of local infiltration, nerve-block, caudal and spinal analgesia are detailed, and there is a well-balanced discussion on the choice of anaesthetic agent for Caesarean section. The opening chapter sets forth some preliminary anatomical and physiological considerations in simple, and occasionally over-simplified, fashion, and the closing chapter deals with the application of anaesthetic techniques to certain obstetric complications. Under the latter heading are included lumbar sympathetic block for venous thrombosis, a procedure declining in popularity among obstetricians; and a description of methods of controlling eclamptic fits, in which the use of continuous intravenous sedation is not mentioned.

This admirable book has been written by an anaesthetist primarily for anaesthetists, but everyone who practises obstetrics is, perforce, an occasional anaesthetist as well as the usual prescriber of analgesic drugs. Indeed all who are concerned with the care of the woman in labour will benefit from reading Dr. Wylie's clear and practical exposition.

"Eden and Holland's Manual of Obstetrics." By ALAN BREWS, M.D., M.S., M.R.C.P., F.R.C.S., F.R.C.O.G. 10th Edition. Pp. 812, 57 plates, 12 in colour, and 378 illustrations. J. & A. Churchill, London, 1953. Price 52*s*. 6*d*.

AFTER an existence of forty-eight years the Manual in its latest edition has a new editor, the distinguished Director of Obstetric Studies, the London Hospital Medical School, in place of Sir Eardley Holland. The intention of the editor is to present the art and science of obstetrics within a reasonable compass in nine parts. It is claimed that the basic requirements of all contemporary examinations in obstetrics are covered. The Guide to Further Reading which concludes each of the parts serves to justify this claim in relation to higher examinations.

In spite of extensive revision, re-arrangement and new illustrations the book has retained its familiar pleasing appearance and character with a well-written logical arrangement of the text and excellent X-ray plates. There is no doubt that it will retain the high esteem earned by its predecessors.

As the Manual reflects very strongly the teaching of the London Hospital Medical School it would perhaps be an improvement if in future editions the actual practice of that hospital could be more clearly indicated. For example in Part IV, Abnormal Labour, when dealing with Ante-partum Haemorrhage, Pulling down a Leg is described as an effective vaginal method of treating placenta praevia including patients not in labour and difficult cases "of central insertion when the placental tissue over the os must be first perforated before the fingers can be introduced". The disadvantages and dangers of this treatment, like those of Plugging the Vagina, are mentioned but perhaps require greater prominence and possibly some indication of the infre-

quency of their employment for patients who can readily receive skilful aid and institutional care.

The Guide to Further Reading at the end of each part could be expanded with advantage by indicating recent trends. For example at the end of Part VIII, Obstetric Operations, the references to Induction of Labour range only from 1905 to 1931, the reference for Failed Forceps is 1927, that for the place of Version in Obstetrics is 1922, and the Collective Investigations into Caesarean Section and the Rupture of the Caesarean Section Scar are dated 1921, while the valuable contrasting investigations reported at the XIIth British Congress of Obstetrics and Gynaecology in 1949 are not indicated in the guide to further reading. This omission is emphasized by the discussion in the text of the mortality rate of Caesarean section with reference and acknowledgment to the Marshall and Cox report at the XIIth British Congress.

The Manual concludes with chapters on Maternal Mortality and Morbidity, Maternal Ill-Health following Childbirth, and the Maternity Service. The improved status of the Home Help is described as an integral and important element in the Service, making a great and increasing contribution to maternal and infant health. Appendices deal with details of diet during pregnancy and lactation, physiotherapy, and social care of women in pregnancy. The index is generous, occupying 26 half-columns on 13 pages.

The whole book while large is convenient to handle. The presentation is of the high quality to be expected from the publishers.

REVIEW OF CURRENT LITERATURE

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ANATOMY

132. **A General Formula for Pelvicephalometry.**

By N. C. CARABELLO, *Amer. J. Roentgenol.*, **71**, 121-130. Jan. 1954. 8 figs. 7 refs.

In this article, the correction factor is estimated by the parallax method which requires two exposures made on the same or separate films and the use of a marker to prevent deviation from the true axial line on the second exposure. The first exposure is made with the Roentgen tube in the central position and the central ray of the tube is directed to the centre of the marker placed on the central point of the film. The second exposure is made with the tube at the same height but after the tube has been shifted horizontally 4 to 6 cm. In breech presentations both exposures are made on one film but in the case of vertex presentation two films are used in order to avoid shadows which might be made by overlapping pelvic bones. For details of technique and calculation, the reader is referred to the full article. It would seem from the instance afforded by the author that great accuracy is secured by this method.

J. H. Mulvany

133. **Simplified Method of Correcting Roentgenographic Measurements of the Maternal Pelvis and the Foetal Skull.**

By G. S. SCHWARZ, *Amer. J. Roentgenol.*, **71**, 115-120. Jan. 1954. 2 figs. 8 refs.

The different methods of correcting for the divergence of the Roentgen-ray beam when measuring the diameters of the maternal pelvis and the size of the foetal skull may be placed roughly in four groups: (1) the geometric, in which the calculations are made according to the target-film and the object film distances, (2) the metal centimetre marker, placed at the same distance from the film as the diameter or object to be measured on the film, (3) the precision stereoscope, and (4) the parallax method, in which the apparent shift of the film-image produced by shifting the roentgen tube, is used to calculate the correction factor.

This communication presents a simple method of calculating the correction factor where the object-film distance is known and the target-film distance is 100 cm.

Equation I: $b:x=a:i$

where a is the target-film distance,
b is the target-object distance,
z is the true size of object for measurement,
i is the size of the film image of the object.

Developing this equation,

$$x=i\,\frac{b}{a}$$

Equation II: $b=a-d$

where d is the object-film distance

Substituting $a-d$ for b, then

$$x=i\,\frac{100-d}{100}$$

Thus, with an object-film distance of 10 cm.,

$$x=i\times\frac{90}{100}$$

i.e., 90 per cent of film image.

An ingenious slide-rule is described which enables the correction factor to be read off at a glance, and reference is made to a more elaborate type which can yield the volume capacity of pelvic diameters, volume of foetal head and the corresponding foetal age.

J. H. Mulvany

134. **In Vivo Studies on the Lymphatic Drainage of the Human Ovary.**

By E. Eichner and E. R. Bore. *Obstet. and Gynec.*, 3, 287-297. Mar. 1954. 10 refs. 7 figs.

Using a blue dye, the authors injected the ovaries at laparotomy of 28 women and noted the spread of the dye in the lymphatics after ligating various ligaments. They conclude from their observations that adequate surgery for the eradication of pelvic malignancy must include removal of the following glands—external and common iliac, hypogastric, obturator, presacral and occasionally lower preaortic.

J. G. Dumoulin

PREGNANCY

135. **Domiciliary Obstetrics—A Survey and Commentary.**

By I. Cookson. *Brit. med. J.*, 1, 841-847. Apr. 10, 1954. 17 figs. 8 refs.

The author, a general practitioner and clinical assistant at the Gloucester Maternity Hospital, has studied 4,441 births, with the primary object of collecting information on the proper selection of cases for home delivery. The material comprised 3 groups—168 confinements in one general practice between 1946 and 1952 (this group thereafter called the "personal" group), 3,273 confinements of residents in a city from 1949 to 1951 either at home or in hospital (labelled "city" cases), and 1,000 domiciliary deliveries outside the city during 1952 (labelled "county" cases).

The "city" group included 97·4 per cent of all city births, and 1,484 or 45·3 per cent were delivered at home, chiefly by midwives. Twenty-nine per cent of primiparae and 55·5 per cent of multiparae were delivered at home. The author feels that too many premature deliveries were permitted at home, with an unnecessarily high stillbirth and neonatal death rate. The "county" cases included abnormalities similar in proportion to the "city" series, but the prematurity, stillbirth and neonatal death rates were lower, presumably owing to better case selections. The "personal" series included only 168 cases. The two most common complications in pregnancy were breech presentation and hypertension. Consultation was sought on 33 occasions, and 15 patients were transferred to hospital. Among the remaining cases there were only 3 babies lost, all unavoidable. Ninety-eight per cent of patients attended for postnatal examination.

The forceps rates in the 3 series were analyzed. If all primiparae over 30 years of age, or those not fully dilated after 24-hours labour, were transferred to hospital, there would be a considerable reduction in forceps delivery at home. The average length of the second stage in forceps cases booked for delivery by a midwife was considerably longer than when a doctor was already booked—it was over 3 hours in primiparae and over 2 hours in multiparae. The author suggests that more frequent episiotomy would diminish the incidence of prolonged second stage and forceps delivery at home.

There were 51 breech deliveries at home, with a total loss of 23·5 per cent and corrected loss of 10 per cent. The foetal loss in the hospital deliveries was lower, especially in the primiparae and it is suggested that breech delivery should not be permitted at home. The incidence of post-partum haemorrhage was only 2·4 per cent after normal deliveries at home, but 13·2 per cent after forceps deliveries. The author suggests the wider domiciliary use of intravenous ergometrine after forceps deliveries or in patients with high parity. The author feels that any practitioner, who is interested in obstetrics and has been well taught as a student, can be allowed to supervise deliveries at home, provided there is adequate consultant support.

[The high rate of post-partum haemorrhage after domiciliary forceps was presumably due to use of general anaesthesia. The use of local anaesthesia by pudendal block would largely eliminate this complication—the technique could be easily mastered by the practitioner.]

Eileen Wilson

136. **Obstetrical Experiences in the Purari Delta, Papua.**

By N. A. Anderson, *Med. J. Aust.*, I, 664-667. May 1, 1954. 3 refs.

The Purari Delta is 180 miles west of Port Moresby. The natives are backward and illiterate. Until 1949 there were no permanent medical establishments and medical patrols were infrequent. Contrary to native customs elsewhere the mother remains in her house for the confinement. No village woman acts as midwife though there may sometimes be other women present. There may be present also the imunu à a—medicine man. His function is to maintain morale by chants. Occasionally he may moisten his hands with spittle and massage the woman's abdomen with a downward stroke.

During labour the woman squats grasping a rail above her head, and bears down at an earlier stage than we would consider advisable. The baby is delivered on to the floor and the mother cuts the cord herself with a sea shell one to two inches from the umbilicus. The cord is not tied. The mother resumes her daily duties in 1-2 days.

There are no native mixtures taken with a view to preventing or treating complications. Some women claim that they can make an abortifacient and some that they can render themselves sterile by drinking certain plant preparations.

Shame is the maternal reaction to the birth of twins. Malign spirits are thought to be responsible for the twins, and to win them over the healthier twin is either killed or neglected. In some cases the occurrence of twins is viewed as a punishment for or evidence of adultery.

Painless childbirth does not occur naturally amongst the Purari women. The author studies 282 mothers admitted to hospital who were delivered of 295 babies.

Five of these, unattended, were confined in dugout canoes on the way to hospital. Six were admitted for retained placenta, 4 for puerperal infections, and 2 for prolapse of the uterus.

In one case of prolapse the cervix became gangrenous and separated. The mean birth weight was 6·12 pounds. Thirty-one per cent were born prematurely. Malaria is one of the factors accounting for this high incidence of prematurity.

Eight per cent had stillbirths. The incidence of twins was 1 in 22. The maternal mortality was approximately 3·2 per cent.

S. Devenish Meares

137. **The Vanderbilt Cooperative Study of Maternal and Infant Nutrition. VI. Relationship of Obstetric Performance to Nutrition.**

By W. J. McGanity *et al. Amer. J. Obstet. Gynec.*, 67, 501-527. Mar. 1954. 6 tables. 1 fig. 19 refs.

This paper reports the results of a study of 2,046 white women in the low and moderate income range attending the prenatal clinic of, and delivered in the Vanderbilt Hospital, Nashville, Tennessee, between 1945 and 1950 in order to determine the relationship, if any, of nutrition to the obstetric and infant outcomes. The diet study included nutrient intakes—total calories, protein, percentage of animal protein, calcium, iron, thiamine, niacin, riboflavin and vitamins A, C and D, while laboratory studies included haematological values and serum protein concentration, fat soluble vitamins in the blood serum, serum ascorbic acid levels and urinary excretion of B vitamins following an oral load test. The women were studied from the time of booking and assessments preceded the recognition of the various obstetric or foetal complications.

Though the average nutrient intake was below that recommended by the National Research Council of the United States of America, there was no instance of frank vitamin deficiency, while blood determinations did not reveal any abnormality that could not be explained by haemodilution or in the case of anaemia by haemodilution and blood loss. Among the pre-eclamptic and eclamptic patients there was a decreased nutrient intake, but consistently so only for niacin. Before the recognition of the toxaemia the toxaemic patient had an elevation of total serum protein which does not support the theory that this disease is due to protein deficiency.

Among other conditions studied were hyperemesis, anaemia, puerperal infection, stillbirths and neonatal deaths, prematurity and breast feeding. With the exception of prematurity, in which there was a lower intake of ascorbic acid and a decreased level of vitamin C in the blood serum, there was no clear indictment of nutritional lack as an important aetiological agent in any of them.

[This is a very laborious and valuable study by a group that included biochemists and statisticians and should be read in the original by all who are interested in nutrition in pregnancy, and especially in its possible relation to prematurity and toxaemia.]

F. J. Browne

138. **Contribution to the Study of Biological Reactions according to the Technique of Galli-Mainini and the Sensitivity of the Common Toad *Bufo vulgaris*.** (Contribution à l'étude de la réaction biologique suivant Galli-Mainini. Etude de la sensibilité du *Bufo vulgaris*.)

By A. Blaton. *Bull. Féd. Soc. Gynéc. Obstét.*, 5, 565-566. 1953.

The writer claims that there is a seasonable variation in the sensitivity of *Bufo vulgaris* to the hormone test for pregnancy. It is greatest at the end of March or the beginning of April and least sensitive in August or September. Amongst the numerous factors responsible for the variations are the weight of the animal, the temperature in which it lives, and to a lesser extent the amount of light to which it is exposed.

Sensitivity of *Bufo vulgaris* is in inverse proportion to its weight. If its weight rises 100 per cent its sensitivity diminishes 90 per cent. Sensitivity remains more or less constant during the colder months of October to early May and results are more reliable in this season; between 15th May and the end of September the patients' serum must be used rather than the urine for the hormone test.

There may be a refractory period of as long as 18 days in certain cases.

Bufo vulgaris, in the region where the writers come from, is sensitive to anything between 6 and 125 international units of chorion gonadotrophins. The number of sperms per field does not constitute a sufficiently accurate basis for quantitative work, but the speed at which a positive result is arrived at can well do.

The results using patient's serum and patient's blood are compared—99·13 per cent were correct in the former and there were 13 per cent false negative results in the latter.

In certain complications of pregnancy such as toxaemia, threatened miscarriage, carneous mole, and hydatidiform mole, patients should be observed for as long as 3 weeks and have the Bufo hormone test repeated every 5 days.

The writers state that the Bufo reaction is not really suitable for quantitative work in an average standard laboratory.

D. Maxwell

139. **Anomalies in the Duration of Pregnancy.** (Le anomalie di durata della gravidanza.)

By J. Caderas de Kerleau and P. Guilhem. *Minerva ginec., Torino*, 5, 799-819. Dec. 31, 1953. 170 refs.

The first author, dealing with abortion and premature labour, adopts for convenience the classification which labels as abortion those pregnancies which stop at or before the end of the 6th month, as premature labour those where the foetus is viable but weighs less than 2,500 g. (5½ pounds), and as protracted pregnancy where the duration exceeds 300 days from the beginning of the last menstruation. The second author dealing with postmaturity, stresses the well-known fallacies associated with delayed and abnormal periods and anomalies of ovulation time.

I. Abortion and premature labour. For the successful evolution of any pregnancy certain conditions must be fulfilled. First, there must be 2 normal gametes capable

of fusion into an ovum which subsequently becomes embedded in a healthy endometrium prepared by maternal hormones to receive it. Certain morphological factors enter into the question at a very early stage—certain genes may be "lethal" and others "sublethal" which may explain the tendency in some families for children of only one sex (females) to be the rule, and for certain cases of sterility where either an incompatibility of the male and female gametes (fertile with other partners) or a defect of one or the other may be assumed. Veterinary medicine has thrown much light on such problems. Death of the embryo, from whatever cause, precedes and determines the process of casting off the conception. The ovum may totally fail to develop (*oeuf clair*), or the foetus may be so malformed that its development ceases at an early stage, or both it and the chorion may undergo hydatidiform degeneration.

Other causes of abortion are anomalies of the chorion, placenta, amnion, liquor amnii and of the cord, including subchorionic haematomata and obliterative arteritis in the placenta, whether of foetal or maternal origin, and implantation too shallow or at an unfavourable site. Maternal causes may be listed—maldevelopment, malformations, diseases and displacements of the uterus, injuries to the cervix, and systemic diseases (the author thinks that the influence of rubella has been exaggerated and attributes more importance to brucellosis, malaria and relapsing fever). [The abstracter agrees that malaria has more effect in producing premature and debilitated infants than as a cause of abortion.] Starvation and the avitaminoses during war and famine increase the rates both of abortion and premature delivery.

Syphilis: the author accepts the possibility of direct paternal origin of foetal syphilis (conceptional syphilis) but believes that the disease is usually transmitted in the later months of pregnancy from the mother through the placenta. The influence of syphilis on abortion, however, is accepted since the abortion rate of syphilitics is 26 per cent and premature delivery is 7 times more frequent in syphilitic mothers than in healthy ones. In untreated syphilis the more recent the infection, the greater the damage to the foetus, but the risk persists for long. Though syphilis in pregnancy calls for immediate treatment, the dosage and preparation of penicillin or other antibiotic need careful selection as a strong curative reaction may precipitate abortion.

Blood incompatibility: ABO antagonism and the Rh factor are considered at some length in relation to abortion.

Endocrines: the author records the theory that the synthetic oestrogens are more effective than the natural oestrogens in producing an increased supply of progesterone where this is deficient by reason of reduced or defective activity of the hypophysis, but states that this is open to doubt, though it appears to be an effective treatment of threatened or repeated abortion in some cases. Rules are given for treatment with progesterone or diethylstilboestrol guided by the excretion of pregnanediol or butyl glycuronidate, but these treatments carry the risk of prolonging the life *in utero* of a defective embryo or of affecting adversely the embryo by submitting it to excessive influence of these hormones. In all cases such hormone therapy should not be carried beyond the 32nd week and should be accompanied by any other indicated treatment, by thyroid, antisyphilitics, vitamins, diet, etc., as may be indicated in the particular case.

It may be said that in 40 per cent of abortions the cause is ascertainable and can be treated. In 30 per cent a biologically appreciable disequilibrium of the endocrines can be demonstrated, the results of treating which are encouraging, and in 30 per cent the ovum is defective or ill-implanted or no cause can be assigned, and these are not susceptible to treatment.

Premature delivery: The importance of preventing this is shown by the fact that of 100 stillbirths 35 are prematures, and of 100 deaths in the first 10 days of life, 77 are prematures. Foetal causes may be twinning, malformations of the foetus, polyhydramnios, placenta praevia, premature rupture of the membranes. Maternal causes are very diverse, including maldevelopment of the uterus, tumours of that or neighbouring organs and certain acute systemic diseases. It is usual to ascribe premature labour associated with hypertension as due to reduction of the foetal blood supply caused by placental infarcts. The author prefers to think of it as a sequel to a disequilibrium of the endocrine balance. Psychic or physical trauma is often quoted as a cause but must be regarded as of less importance than formerly allowed. Pregnancy may proceed to term even after fractures of the pelvis. At the same time, the social policy of ceasing active employments for the last month of pregnancy appears to be well justified by the increased weights and well-being of the resulting babies. The author refers to the curves of hormonal activity during pregnancy worked out by Jayle and Jalletta for progesterone and the oestrogens by assays of pregnanediol and butyl glycuronidate, but considers the quantities of these less significant than a sudden alteration of their ratio to each other as indicating the imminence of normal or premature labour. Labour is preceded by a rise in the follicular hormone accompanied by a fall in progesterone. Some workers, however, contest this and find the changed proportions only after labour. Confirmatory tests of Mayer and Levasseur on the alteration of vaginal secretion acidity may be used, a veering in the acidophil direction indicating diminished proportion of progesterone and threat of labour. However, rest in bed, sedatives and antispasmodics, and progesterone are still the sheet-anchors in imminent cases, with subsequent steps to safeguard succeeding pregnancies where definite causes can be established. The synthetic oestrogens are of especial use in stimulating a strong luteinizing action.

As regards the premature infants, the chief dangers during birth are anoxia and vascular fragility. The former calls for plenty of oxygen to the mother during labour, cautious use of oxytocics well diluted by venous perfusion, and avoidance of premature rupture of the membranes (except where this is deliberately performed for induction). For the vascular fragility vitamins P, K and E may be used. Anaesthetics should if possible be avoided or cut to the minimum, and labour assisted by episiotomy under local analgesia rather than by forceps. At the time

of actual expulsion, plenty of oxygen must be given to the mother and the infant's cord should be cut tardily. [The abstracter, in such cases and in Caesarean babies, left the placenta attached and exposed to warm air till the vigorous aspirations of the baby had caused the blood circulation in the cord to cease.] Afterwards, the resuscitation of the baby and its care in a special "prem. centre" is by now well understood.

II. Postmaturity. In accepting data as regards this, 2 factors are essential. We must be dealing with a woman whose precise memory and good faith cannot be doubted, and one whose menstrual periods are invariably regular at 28-31 days' interval. In a short series controlled by the temperature method of dating ovulation, the maximum duration from ovulation to delivery was 285 days, but so many examples apparently well established of pregnancy very considerably exceeding this are on record, that the occurrence of abnormal prolongation of pregnancy must be accepted and considered, even admitting that delayed ovulation can be held to account for a large number of these cases. The importance of postmaturity (medico-legal aspects apart) lies in its risks to the child. Many series have been compiled showing the rapid increase of risk when labour is overdue according to the usual menstrual calculation. Examples: mortality 0·5 per cent at term, 1·5 per cent after 10 days, 10 per cent after 20 days. One evidence of the danger is the progressive fall in oxygen saturation in the blood of the umbilical vein. It is possible in animal experiment to prolong pregnancy by hormonal injection, the progeny ultimately being born dead. The weight of the foetus is notoriously fallacious as evidence of maturity though not devoid of some value. Twins can differ by as much as 2½ pounds in weight at birth, and foetal weight is much affected by the efficiency of the maternal circulation. Radiological evidence may be difficult to assess owing to hydramnios, maternal-foetal superposition, etc.

Obstetricians will no doubt continue to differ on their attitude to this problem. Some will say "There is no problem, all cases are explicable by delayed ovulation" and leave the case to nature; others, the interventionists by temperament, will induce labour early or late as giving a quicker or safer delivery to a well-developed child. The authors appear to incline to non-interventionist views, although admitting that exceptionally the pregnancy may be prolonged well beyond term and the foetus suffer or die as a result of placental senescence or birth injury.

W. C. Spackman

140. **Adrenocortical Function in Toxemia of Pregnancy.**

By E. H. Venning, B. Singer and G. A. Simpson. *Amer. J. Obstet. Gynec.*, **67**, 542-548. Mar. 1954. 2 tables. 27 refs.

This investigation from McGill University, Canada, was carried out on 17 normal pregnant women and 43 women with toxaemia of pregnancy of mild, moderate, or severe degree, according to the criteria of the American Committee on Maternal Welfare, and in addition 6 cases of pregnancy with hypertension were also investigated.

There was a significant increase in the free and conjugated formaldehydogenic corticoids in patients with mild or moderate symptoms. In the 9 severe cases the mean value for the free neutral fraction was lower than that found in the moderate cases, but still above that found in normal pregnancy. In patients with hypertension the values were only slightly greater than normal. The sodium retaining factor was increased in all the cases of toxaemia but there was no correlation between the severity of the symptoms and the sodium retaining effect.

Examination of the charts reveals, however, that with the exception of the sodium retaining factor there is considerable overlapping of the values in normal and toxaemic patients, many of the figures in the toxaemic group being within normal range.

F. J. Browne

141. **Does Vascular Damage Follow Toxaemia of Pregnancy?**

By F. A. Finnerty. *J. Amer. med. Ass.*, **154**, 1075-1079. Mar. 27, 1954. 11 refs.

The establishment of a toxaemia clinic at the Gallinger Municipal Hospital, Washington, enabled the author to study patients from the onset of toxaemic symptoms during pregnancy and until all signs and symptoms had disappeared after delivery. The first 303 cases (all but 2 were Negro patients) are analyzed in this report. Although most of them were referred from the obstetric department with a diagnosis of true toxaemia, by the author they were classified as hypertensive vascular disease, 216; hypertensive vascular disease with superimposed toxaemia, 28; post-partum hypertension, 14; and true toxaemia, 45. Considerable importance is attached to ophthalmoscopic examination in the differential diagnosis and especially to the early appearance of a glistening retinal sheen in true toxaemia which has received little attention compared with the characteristic retinopathy of hypertensive vascular disease.

In the hypertensive group 67 became normotensive during pregnancy although retinopathy was present throughout. These patients became hypertensive again immediately after delivery. The 28 patients developing superimposed toxaemia and previously showing the chronic retinal changes of hypertension developed retinal sheen several weeks before the appearance of clinical oedema and albuminuria. Fourteen cases developed transient hypertension in the post-partum period without any other abnormality. It is suggested that some of these cases result from the routine use of ergonovine, while others may be hypertensive patients who became normotensive during pregnancy. Only a long term follow-up study can prove whether hypertensive vascular disease may sometimes first show itself by transient post-partum hypertension.

Of the 45 true toxaemia patients, 25 had no residual toxaemia at six weeks post-partum, but in 20 patients, although the manifest signs and symptoms of toxaemia had disappeared, examination of the retinas revealed that the retinal sheen was replaced by a definite retinopathy. The average duration of the toxaemia in the group that ultimately showed retinal changes was 6·2 weeks; in the complete recovery group it was 2·4 weeks. The retino-

pathy, which may be the only residual evidence of vascular damage, is related to the duration of the toxaemia rather than the severity.

D. W. James

142. **Fetal Losses in Hypertension and Pre-eclampsia. Part 1.**

By H. C. TAYLOR, A. J. B. TILLMAN and J. BLANCHARD. *Obstet. & Gynec.*, **3**, 225-239. Mar. 1954. 19 refs. 14 tables.

A careful analysis of 4,432 cases of toxaemia from Columbia University and Medical Centre has been made to determine the prognostic factors in foetal loss. 12·2 per cent of all patients delivered had toxaemia, although many were mild cases. The cases were divided into 5 groups on the basis of the time of onset of hypertension and other symptoms, and each group was further subdivided according to the level of blood pressure and amount of albuminuria present on admission to hospital. The findings were related to the ultimate outcome for the foetus. In 306 patients with known pre-existing hypertension the total foetal loss was 15·7 per cent, whilst it averaged 13·3 per cent in a group of 758 cases with a raised blood pressure at the first antenatal visit. In 2,317 cases of pre-eclampsia the average foetal loss rate was 6·6 per cent, and in 239 cases with a presumptive diagnosis of pre-eclampsia (cases with toxaemia apparently commencing in the last trimester) it was 13·1 per cent. In 706 cases, in which toxaemia developed in the second trimester, the figure was 10·6 per cent.

J. G. Dumoulin

143. **Fetal Losses in Hypertension and in Pre-eclampsia. Part 2.**

By H. C. TAYLOR, A. J. B. TILLMAN and J. BLANCHARD. *Obstet. & Gynec.*, **3**, 371-384. Apr. 1954. 10 tables, 24 refs.

Continuing their report, the authors find that the foetal loss in toxaemic mothers for each week of pregnancy is as follows:

Week	29-30.	31-32.	33-34.	35-36.	37-38.	39-40.	41-42.
Percentage losses	60	40	25	10	6	2	3

Toxaemia does not seem to affect the loss rate of babies born alive, which is related simply to the degree of prematurity. The prognosis for the foetus for a given week depends on the level of blood pressure and the intensity of the albuminuria. Patients with severe hypertension and severe albuminuria should have their pregnancy terminated in the 33rd or 34th week. Those with severe hypertension and moderate albuminuria, those with moderate hypertension and severe albuminuria, and those with moderate hypertension and moderate albuminuria should have their babies in the 37th or 38th week. All others with less severe combinations should be allowed spontaneous onset of labour.

The authors point out that their conclusions are concerned with foetal survival and do not consider the maternal risks involved.

J. G. Dumoulin

144. **The Estimation of Uric Acid Content in the Blood as a Guide to Prognosis in Pre-eclampsia and Eclampsia.** (Zawartosc kwasu moczowego we krwi jako wskaznik rokowniczy w stanach przedrzucawkowych i w rzucawce.)

By T. ZIELINSKI. *Ginek. polska*, **25**, 97-104. Jan./Mar. 1954. 29 refs.

The author reviews a number of new chemical and haematological tests that have been used in recent years to indicate the severity and prognosis of eclampsia.

His experience shows that the most sensitive indication is the increase of the uric acid level in the blood.

On the basis of his own observations he is of the opinion that a plasma uric acid level of 6 mg. per cent is the border line; anything above this level is a warning that an attack of eclampsia is threatening, while, if there is no improvement over a period in spite of conservative treatment, the danger of permanent renal damage exists.

S. H. Riterband

145. **The Place of Synthetic Antihistamines in the Treatment of Threatened Abortion.** (Gli anti-istaminici nel trattamento della minaccia d'aborto.)

By P. SORA. *Minerva ginec., Torino*, **6**, 115-116. Feb. 28, 1954. 6 refs.

In view of the importance which has been demonstrated of ABO incompatibility in cases of repeated abortion for which no other cause can be found, the author sets out to examine the validity of his thesis that some of these cases show characters of allergy. The special diagnostic points in such cases are ABO incompatibility of the parents, increased eosinophilia and a positive histamine reaction in the woman early in her pregnancy. He treated 23 cases of threatened abortion showing these characteristics with the synthetic antihistamine "Antistin" by mouth or by injection at a daily dosage of 300 to 800 mg. with success in 18 cases. Whilst admitting that no firm conclusions can be drawn, he feels that in "causeless" repeated abortions this line of treatment is a rational one and well worth further trial.

W. C. Spackman

146. **Stilboestrol Treatment after Spontaneous (Including Illegal) and Therapeutic Abortion. I. Influence on Morbidity.**

By B. VON FRIESEN. *Acta obstet. gynec. scand.*, **33**, 50-59. 1954. 8 refs. 6 figs.

Working at the Department of Gynaecology of Sabbatsberg Hospital, Stockholm, the author treated 471 cases of abortion with stilboestrol, 431 similar cases not so treated serving as controls. An oral dose of 2 mg. of stilboestrol, given after completion of "therapeutic" abortions 3 times daily for 3 to 4 days, considerably reduced morbidity and length of stay in hospital. In spontaneous and illegal abortions, too, there was a noticeable, though less marked effect of this medication on the temperature.

N. Alders

147. **Pregnanediol Elimination in the Course of Pregnancy.** (Elimination du prégnandiol au cours de la grossesse.)

By R. BORTH. *Gynéc. et Obstét.*, **53**, 27-41. 1954. 47 refs.

As endocrine phenomena are extremely complicated the value of estimations of the excretion of pregnanediol should only be used as an addition to the clinical picture and should not be regarded with great importance.

The new technique of paper chromatography may be of assistance in differentiating the urinary steroids. Radioactive isotopes may also play a part in these estimations.

In cases of abortion it is difficult to know whether the disturbance of hormonal balance is primary or secondary to the accident, or even a solitary symptom.

The physiological role of progesterone and oestrogens has been established beyond doubt by their employment in the production of a normal menstrual cycle in the castrated female. To produce a similar experiment in pregnancy is impossible, but there is evidence enough to use hormones in the treatment of threatened abortion.

David Maxwell

148. **Prolonged Anuria. Successful Management by Continuous Infusion into the Inferior Vena Cava.**

By C. S. RUSSELL, C. J. DEWHURST and J. C. BRUCE. *Lancet*, **1**, 902-905. May 1, 1954. 2 tables. 1 fig. 11 refs.

The authors describe the successful treatment adopted in a case of suppression of urine following criminal abortion, and draw attention to the fact that continuous infusion through a "polythene" catheter in the inferior vena cava for a period of 17 days was successfully accomplished.

Intravenous therapy was needed as persistent vomiting by the patient made it necessary to abandon the gastric drip of glucose, peanut oil and acacia. To provide the patient with the necessary 1,600 calories and a basic allowance of 1 litre of fluid a day, a 40 per cent dextrose solution was needed. To avoid producing thrombosis in a smaller peripheral vein, the solution was given through a cardiac catheter introduced as far as the superior vena cava at the rate of 1 litre per 24 hours. Unfortunately this procedure produced thrombophlebitis in the basilic vein and was abandoned on the 10th day of treatment. A "polythene" catheter was inserted into the inferior vena cava via the saphenous vein exposed in the femoral triangle and the infusion dripped through this for 17 days without any complication. Heparin and penicillin were added to the infused fluid and fluid loss in vomit or urine was compensated for by the addition of 5 per cent dextrose in water. Additions were also made to establish electrolyte balance which was checked daily from blood samples removed from the inferior vena cava via the "polythene" catheter.

H. H. Fouracre Barns

149. **Acute Nephritis with Anuria in Septic Abortion.** (Orstra nerczyca z bezmoczem w poronieniach zakazonych.)

By W. MUSIAL and M. EDELMAN. *Ginek. polska*, **25**, 21-31. Jan./Mar., 1954. 19 refs.

The authors report a case of acute nephritis with anuria complicating septic abortion. The renal disease is either the result of an infection caused most frequently by anaerobic organisms, or of toxaemia caused by chemical compounds introduced into the uterus during the attempts to interrupt the pregnancy.

The renal ischaemia, the haemoglobinuria and the direct effects of the toxins, cause severe damage to the kidneys, with the production of degenerative changes in the tubules. The clinical picture is characterized in the early phase by infection, haemoglobinuria, anaemia and jaundice. In the later stages there is a severe functional disorder of the kidneys with oliguria or anuria and with rapid increase of the nitrogen compounds in the blood. Prognosis is grave and depends on the intensity of renal damage.

The treatment in the early stages is directed against the infection; later, to combat the anuria and increase nitrogen excretion. The authors suggest exchange blood transfusion, peritoneal dialysis and intestinal lavage with hypertonic solutions. The disorders of the water and electrolyte balance should be dealt with by the administration of glucose, sodium chloride and fluids.

S. H. Riterband

150. **Is Chorionepithelioma due to Lack of a Lytic Substance in the Maternal Blood?**

By H. ACOSTA-SISON. *Amer. J. Obstet. Gynec.*, **67**, 634-638. Mar. 1954. 6 refs.

It has been claimed that the reason why the trophoblast of the early embryo does not always develop into malignant mole or chorionepithelioma is the presence in the maternal circulation of a lytic substance, and the injection of blood serum from a normal pregnant woman has even been advocated as a cure for chorionepithelioma. The author disproves this theory by citing 2 cases of twin pregnancy in one of which a malignant hydatidiform mole and in the other a metastasizing chorionepithelioma developed, the other foetus and placenta in each case being normal. She considers that the malignancy of chorionepithelioma resides in the cell itself and suggests that it is due to chorionic gonadotrophin which is known to be secreted by the cytotrophoblast.

F. J. Browne

151. **Placenta Praevia.** (In English.)

By A. WESTGREN. *Acta obstet. gynec. scand.*, **33**, 29-49. 1954. 29 refs. 12 figs.

This is a clinical study of 350 cases of placenta praevia observed in Stockholm in the 10-year period 1940-49. The incidence of placenta praevia was 0·262 per cent. Sixteen per cent of the cases were type I (F. J. Browne's classification), 17 per cent were type II, 21 per cent type III, and 46 per cent type IV. The incidence of primigravidae in this series was 26 per cent. Fifty-seven per cent of the multiparae had previously had a pathological pregnancy. In 32 per cent of the cases the mothers were treated expectantly. Caesarean section was the method of delivery in 45 per cent, vaginal operations were performed in 27 per cent, and the remainder (28 per cent) had spontaneous deliveries The maternal mortality was 2·9 per cent, and the causes of death were as follows: loss of blood, 4 cases; loss of blood and secondary infection, 4 cases; secondary infection, 1 case; and pul-

monary embolism, 1 case. Of the 357 children born, 222 were still alive 6 months after birth, the overall infant loss being 38 per cent; in 3 per cent of the cases death occurred before delivery, in 24 per cent during delivery, in 9 per cent before the 4th day of life, and in 2 per cent within the first 6 months of life. The perinatal mortality was high in the cases in which there was severe maternal anaemia, bad general maternal condition, and placenta praevia types III or IV. In 3·9 per cent there were congenital malformations of the foetus, exactly one-half of them of the heart.

In the group of mothers who were treated expectantly, the incidence of Caesarean section was higher than in the other cases; the maternal mortality was 7·3 per cent in this group; it is, however, noteworthy that all these deaths occurred in the first half of the period under review. The subsequent sharp decrease in the maternal mortality is ascribed to the greatly improved facilities for blood-transfusion. The figures of perinatal mortality showed only slight improvement during the period studied and were much higher than those published in the British and American literature in recent years.

It is suggested that the infant mortality might be lowered (1) by early diagnosis of placenta praevia, (2) by expectant treatment until the foetus has reached maturity, (3) by using blood transfusion more freely.

N. Alders

152. **Cardiopathies and Pregnancy.** (Cardiopatias y embarazo.)

By M. TORNER-SOLER. *Rev. espan. Obstet. Ginec.*, **72**, 341-356. Nov./Dec. 1953. 4 tables. 43 refs.

This paper is an evaluation of the results obtained from 1948 to 1952 in the Provincial Maternity Centre of Barcelona in the case of pregnancies complicated by cardiopathies. It is in too great detail to summarize completely, but the author's main findings are as follows:

As a background to his work he mentions that MacDonald (*On the Bearing of Chronic Diseases of the Heart upon Pregnancy*. Churchill, London) in 1878 stated that cardiac disease complicating pregnancy carried a maternal mortality of 55 per cent, whereas Jensen (*The Heart in Pregnancy*. 1938. Mosby, St. Louis) was able to show that with adequate care this figure had dropped to 2 per cent by 1933.

The author presents his results in 102 cases of organic heart disease, which were discovered in 6,685 pregnancies from 1948 to 1952—an incidence of 1·5 per cent.

Among the cases classified clinically as favourable, there was no maternal death, and there was only 1 maternal death in the whole series, a patient with severe rheumatic heart disease and auricular fibrillation—an incidence of 0·98 per cent mortality.

Rheumatic heart disease constituted 94 per cent of all cases, and in 97·9 per cent of these the mitral valve was affected, alone or in combination with other valvular disease. There was cardiac insufficiency in 30·3 per cent and 87 per cent of such insufficiencies occurred during pregnancy, the rest during or after labour. In 64·5 per cent of cases insufficiency occurred during the seventh or eighth months, whereas only 12 per cent of the favourable cases developed insufficiency; all of the clinically unfavourable cases did so.

In 65·6 per cent of cases the delivery was spontaneous, and in 27·4 per cent delivery was facilitated by the use of forceps. In 34·3 per cent of cases anaesthesia was administered, and for this caudal analgesia was the method of choice.

In no case was Caesarean section performed, when the indication would have only been that of cardiac disease, neither was premature induction of labour.

The author considers that the maternal mortality, which they have obtained by means of rest and medical treatment, is lower than that obtained by most authors with a so-called therapeutic abortion.

D. G. Wilson-Clyne

153. **Coarctation of the Aorta and Pregnancy.**

By A. N. KENWICK and J. A. WILSON. *Amer. J. Obstet. Gynec.*, **67**, 419-21. Feb. 1954. 1 ref.

Three cases of coarctation of the aorta are reported all of whom were successfully delivered by the vaginal route. There is an increasing consensus of opinion, in which the authors concur, that neither induction of abortion nor Caesarean section is indicated in these cases; neither is routine sterilization necessary, for surgery now offers excellent prospects of successful repair.

F. J. Browne

154. **Mitral Valvotomy During Pregnancy.**

By R. MULCAHY. *J. Irish med. Ass.*, **34**, 96-98. Apr. 1954. 7 refs. 2 figs.

The natural course of rheumatic heart disease is not altered significantly by childbearing provided patients survive the immediate hazards of pregnancy. Mitral stenosis because of these immediate hazards is an important cause of maternal mortality today and, in addition, it is an important cause of disability during pregnancy and many patients have to occupy expensive antenatal beds.

Of all the complications associated with heart disease and pregnancy, pulmonary oedema is probably the most important as the onset is often unexpected and it is associated with a high mortality. Pulmonary oedema appears most often at the 7th or 8th month when the blood volume and blood flow are greatest; the narrow mitral valve obstructs the increased flow of blood and the left atrial and pulmonary venous pressures begin to rise and pulmonary capillary pressure reaches a level at which oedema appears. Mitral valvotomy, in selected cases, will help to prevent this complication and the case histories of 3 patients on whom mitral valvotomy was performed during pregnancy are given.

The author makes the following suggestions for the selection of patients suitable for valvotomy during pregnancy: (1) The patient who has had one or more attacks of pulmonary oedema during a previous pregnancy. In the author's experience patients prone to pulmonary oedema, generally have pure uncomplicated mitral stenosis. Operation is advised during the first 3 or 4 months of pregnancy. (2) Valvotomy should be

considered as an emergency measure at a later stage in pregnancy when there is a serious threat of pulmonary oedema or a poor response to treatment for heart failure. (3) The patient, who has had definite symptoms during the non-pregnant phase and in whom aggravation of these symptoms might reasonably be expected, particularly during the later months of pregnancy.

The author believes that mitral valvotomy should at present be kept for the most seriously disabled patients, and operative treatment for the less disabled patients should be deferred until it can confidently be stated that stenosis does not recur a number of years after operation. The author suggests that time and experience will show whether valvotomy before or during pregnancy will have any effect in reducing the incidence of miscarriages, stillbirths and neonatal deaths where pregnancy is complicated by mitral stenosis.

J. K. Russell

155. **Iron Metabolism in the Anaemias of Pregnancy.** By H. G. Hamilton, R. S. Higgins and W. S. Alsop. *West J. Surg. Obstet. Gynec.*, **62**, 205-213. Apr. 1954. 3 figs. 30 refs.

The authors give a good review of recent findings on iron metabolism and point out that the maximum absorption of iron from the diet is 1 mg. a day while the iron requirement for additional haemoglobin synthesis to compensate for the increase in blood volume is 400 mg. In addition the foetus requires 500 mg. and the mother will lose 200 mg. more in the placenta and blood loss at delivery. It is therefore obvious that the mother will inevitably have an iron deficit and must get a microcytic anaemia unless energetic therapeutic steps are taken. All authors are agreed that most women respond well to oral iron therapy but it is pointed out that, to be truly effective, additional iron must be given for at least 150 days before delivery is expected. Iron should also be given during the puerperium. There is a well defined group of patients who cannot absorb iron even when it is given with ascorbic or hydrochloric acid; these patients respond to intravenous administration of saccharated iron oxide but the method is not without risk.

The megaloblastic anaemias of pregnancy are relatively rare and must be diagnosed by marrow biopsy. This type may be treated with folic acid or vitamin B_{12} but it is the only condition in pregnancy for which the use of these and other liver compounds is justified. The hypoplastic anaemia of pregnancy does not respond to any parenteral treatment and the patient requires repeated blood transfusions; the bone marrow resumes function after termination of the pregnancy.

In their study of these anaemias, the authors use as an arbitrary standard of "anaemia" a haemoglobin concentration of less than 12 g. per 100 ml. blood (approx. 80 per cent. on the Haldane scale). In all 1,746 women were treated with 1,170 mg. (18 gr.) ferrous sulphate with molybdenum oxide daily; 1,290 (74 per cent) responded satisfactorily. Of those who did not respond 237 were then given dilute hydrochloric acid with their iron and 177 (75 per cent) showed a successful rise and maintenance of their haemoglobin level. There were 118 women who were treated with intravenous iron (900 mg. iron monoxide, 20 mg. per ml. given in 5 doses); 16 patients had reactions of sufficient severity to warrant interruption of treatment but buffering the solution reduced the reaction rate. Of these 86 cases (73 per cent) responded satisfactorily and 15 of the 32 failures responded to folic acid. The total result of the whole series was 90 per cent success in combating anaemia in pregnancy.

[This is a good paper and stresses that therapy must begin early in pregnancy to be effective. It is not clear how many patients were anaemic at the start of treatment and this may affect the results.]

D. C. A. Bevis

156. **Histological Examinations of the Cervices in Pregnant Women. (Erosion and carcinoma in situ.)** (Histologische Untersuchungen an der Cervix schwangerer Frauen. (Die Erosion und das Carcinoma in situ.)) By H. Hamperl, C. Kaufmann and K. G. Ober. *Arch. Gynäk.*, **184**, 181-280. Apr. 1954. 66 illus. 3 tables. 60 refs.

Single punch biopsies of the cervix at 12 o'clock were carried out on 361 women, who had been admitted to hospital as cases of abortion, for termination of pregnancy or in need of operative obstetrics. The average age of these women was 29·3 years and their average parity was 2·7. In 84 cases this biopsy failed to produce material from the squamo-columnar junction and these are not included in the survey. Of the remaining 277 cases only 13 had histologically normal cervices, the rest showing either active or healing erosions.

The healing stages of erosion are discussed in detail and richly illustrated with special reference to the ascending or descending types of repair.

In 9 patients with neither symptoms nor signs indicative of malignant disease there was histological evidence of carcinoma. Seven of these were classified as "in situ" lesions and 2 as "microcarcinomas" with early invasion. This incidence of 3·25 per cent corresponds with American figures, viz. Greene *et al* ($2 \cdot 35 \pm 1 \cdot 03$ per cent) and Pund ($5 \cdot 45 \pm 1 \cdot 77$ per cent).

The case histories of these patients are discussed in detail. Case 1 is especially remarkable in so far that after the initial diagnosis was made no radical treatment was given since the patient, a 29-year old gravida-2 was suffering from an unrelated septicaemia and was considered too ill. Nine months later, when vaginal smears and cervical scrapings were still showing abnormal squamous cells, histological examination, i.e., repeat punch biopsy, revealed basal cell hyperplasia only. This raised the question of regressive changes in a carcinoma in situ and treatment was withheld. Twenty months later abnormal cells were still found at cytological examination. The patient was re-examined after 3 years, when she had an indurated, hard, irregular cervix which bled on touch. The histological diagnosis on the amputated cervix was "invasive squamous carcinoma". Wertheim's hysterectomy was subsequently carried out and there was extensive involvement of the lymph glands.

Three other patients, with an initial diagnosis of carcinoma in situ, eventually developed invasive carcinoma 3 and 5 months, and 5 weeks respectively after the initial diagnosis was made. They were radically treated and there were no recurrences to date. In 2 other patients the histological diagnosis of carcinoma in situ remained unchanged 5 and 14 months after termination of pregnancy; they are still under observation, no treatment being given. A third patient in this group was re-biopsied one year after the original diagnosis was made and showed no histological changes.

The 2 patients with microcarcinoma were treated by Wertheim's hysterectomy and no recurrence was observed 14 and 18 months later.

The localization of the "in situ" lesions was identical with the areas affected in cervical erosion. The authors suggest that this indicates a close histogenetic relationship between carcinoma in situ and squamous metaplasia. They discuss and illustrate one case in detail where they believe to have found a transitional stage between ascending metaplasia and carcinoma in situ.

The 2 cases of microcarcinoma differed from the "in situ" lesions only in so far that there was invasion present; their histological structure and clinical behaviour were indistinguishable from a carcinoma in situ.

Carcinoma in situ and microcarcinoma diagnosed during pregnancy show no rapid regression after termination of pregnancy. The question whether these histological lesions are early stages of true invasive carcinoma cannot as yet be decided. The authors argue, however, that, in view of the high incidence of these cases during pregnancy, compared with the incidence of true invasive carcinoma in the same age group in non-pregnant patients, these seem to be two entirely different conditions. They agree that it might be possible to regard "carcinoma in situ" as a precancerous lesion which may lead to the development to true invasive carcinoma after many years.

[It seems curious that although 4 out of 7 cases of carcinoma in situ observed during pregnancy became invasive, the authors maintain that carcinoma in situ is an essentially different lesion from "true carcinoma". It is equally difficult to follow their argument concerning primary invasive microcarcinoma. Furthermore their arguments are based on the histological findings in single punch biopsies at a fixed localization. It seems questionable whether such far-reaching conclusions as regression of a lesion can be drawn when so limited an area is investigated.]

Erica Wachtel

157. **Diabetes and Pregnancy: Transplacental Passage of Insulin.** (Diabete e gravidanza: passagio transplacentare dell'insulina.)

By P. Spoto. *Minerva ginec., Torino*, **6**, 61-73. Jan. 31, 1954. 263 refs.

It is perhaps strange that even now, 31 years after the isolation of insulin, experiments are made on the problem of its passing through the placenta. The question is related to the excess size of the infants frequently born to diabetic mothers of which there are so many examples and so many proposed explanations, involving the related activity and interactions of the endocrine glands of both mother and child.

The author relates his experiments on the passage of insulin from mother to foetus and from foetus to mother in laboratory animals, using rabbits and ewes. For the purpose, the umbilical vein of the foetus can be utilized after laparotomy and hysterectomy well away from the placental site; the foetus is exposed and if kept warm and covered it remains in good condition throughout the experiment and the uterus does not undergo contractions.

It was found by estimations of the blood sugar that insulin passes from the mother to the foetus in both sheep and rabbits. It also passes from foetus to mother in rabbits but results in sheep on this point were not constant. If one foetus is injected through its umbilical vein, the insulin does not appear to reach another foetus even in the same uterine horn—the blood sugar falls in the injected foetus but not in the other.

W. C. Spackman

158. **Diabetes insipidus and Pregnancy.** (Diabetes insipidus und gravidität.)

By M. Foukas and J. Karpousoglou. *Gynaecologia, Basle*, **137**, 171-178. Mar. 1954. 1 fig., 13 refs.

The association of diabetes insipidus with pregnancy is a rare one. A case record is presented here and the authors first discuss some theoretical considerations. They believe that there is an antagonism between the adrenal cortex and the neurohypophysis. In support of this they describe experiments carried out on dogs which showed that, after administration of water, diuresis was inhibited by pitressin but facilitated by desoxycorticosterone acetate (DOCA). When pitressin and DOCA were given together, renal excretion of water was normal.

The case record concerns a woman who developed diabetes insipidus after a dogbite. The 24-hour excretion of water averaged 22 to 24 litres. In her first pregnancy, polyuria and polydipsia continued unchanged. The pregnancy was uneventful and the child was normal. Two subsequent pregnancies followed a similar course.

Josephine Barnes

159. **Extrapulmonary Tuberculosis and Pregnancy.**

By G. Schaefer, R. G. Douglas and I. H. Dreishpoon. *Amer. J. Obstet. Gynec.*, **67**, 605-615. Mar. 1954. 7 tables. 28 refs.

The authors describe the course of pregnancy and delivery and the after-results in 54 patients with extrapulmonary tuberculosis distributed as follows: osseous, 21 (none with active lesions); renal, 18; lymph nodes (usually cervical), 9; intestinal, 3; pericardial, miliary and peritoneal, 1 each. Their results show that extrapulmonary tuberculosis is not unfavourably affected by pregnancy, and the infants are normal and of average weight. Therapeutic abortion is not indicated, and treatment of the disease would be carried on as if the patient were not pregnant. There is no contra-indication to the use of antituberculous drugs, and necessary operations such as the excision of glands or of 1 kidney can be safely under-

taken. Delivery is not unfavourably affected and the choice of anaesthetics is not restricted as it is in pulmonary tuberculosis.

F. J. Browne

160. **Interstitial Pregnancy. Report of Four Cases.**
By G. E. JUDD and N. FERRERO. *West. J. Surg. Obstet. Gynec.*, **62**, 136-151. Mar. 1954. 15 figs. 20 refs.

The criteria for diagnosis of this condition are defined as: the presence of foetal elements, uterine muscle surrounding the gestational sac, no connexion between the sac and the uterine cavity unless there is evidence of rupture between the two, the isthmus of the tube not involved except by stretching from the growing mass, absence of true decidua lining the gestational pouch. Glaesmer's classification of types is reviewed: I, ovum develops in fundus muscularis; II, development occurs in side wall of uterus either anteriorly or posteriorly; III, development occurs towards the isthmus of the tube. The aetiology is the same as exists for any ectopic pregnancy and accurate diagnosis is rarely made before operation, most cases being thought to be ruptured tubal pregnancies. There is sometimes no vaginal bleeding before rupture of the sac in the interstitial type. The treatment is always surgical and hysterectomy is usually required although with better resuscitation it should be possible to repair the tear; as the sac does not communicate with the uterine cavity the outlook for further pregnancy might be reasonable.

The 4 cases are well described (they partially illustrate all Glaesmer's types) and there was no mortality. X-rays did not help in diagnosis as the foetal parts were obscured by the large amount of blood present.

D. C. A. Bevis

161. **The Relationship of Endometriosis to Tubal Pregnancy.**
By A. WIST. *Acta obstet. gynec. scand.*, **33**, 69-82. 1954. 29 refs. 5 figs.

The author examined 104 pregnant tubes from cases operated on in the Women's Clinics of Helsinki University between 1945 and 1951, with a view to ascertaining the relationship between tubal endometriosis and tubal pregnancy. Endometriosis was found in 5 of the examined tubes, bringing the total number of such cases described in the literature to 39. On the basis of the literature and of his personal investigations the author arrived at the following conclusions. On the whole, tubal endometriosis is only of secondary importance in the aetiology of tubal pregnancy; in the relatively few cases in which it does cause tubal pregnancy it does so by acting as a mechanical obstacle in those parts of the tube in which the lumen is normally narrow. The majority of interstitial pregnancies occur as a sequel to endometriosis in this part of the tube, and endometriosis is also aetiologically significant in tubal pregnancies situated in the parts of the isthmus immediately adjoining the interstitial portion, but in other parts of the tube it is not usually an aetiological factor.

N. Alders

162. **Primary Ovarian Pregnancy. Case Report.**
By R. TOAFF and M. SALZBERGER. *Gynaecologia, Basle*, **37**, 178-183. Mar. 1953. 3 figs. 5 refs.

Primary ovarian pregnancy is very rare. From 1945 until half-way through 1952, at the Hadassah University Hospital, Jerusalem, there were 12,613 births and 1,042 abortions. During the same period there were 42 ectopic pregnancies, of which only 1 was diagnosable as certainly a case of primary ovarian pregnancy. This gives an incidence of 0·014 per cent of all pregnancies and 2·3 per cent of all ectopics.

The criteria of Spiegelberg (*Arch. Gynäk.*, **13**, 73, 1878) are quoted. These are follows:

1. The Fallopian tube must be of normal appearance and be separate from the ovary containing the pregnancy.
2. The gestation sac must definitely occupy the normal place in the ovary.
3. The gestation sac must be connected to the uterus by the ligamentum ovarii proprium.
4. In the wall of the sac, ovarian tissue must be demonstrable.

The report describes and illustrates a case where a foetus 2 cm. long was found in an ovarian pregnancy. The diagnosis was confirmed by histological examination.

The classification of Stux (1941; cited by J. C. Litzenberg in *Nelson Loose-leaf living surgery*, **7**, 536) is quoted. He divided such pregnancies into intrafollicular, superficial and interstitial. The case described here appeared to be of the intrafollicular variety.

Josephine Barnes

163. **Ovarian Pregnancy.** (Graviditas extrauterina ovarica.)
By V. FINDERLE. *Gynaecologia, Basle*, **137**, 184-191. Mar. 1954. 1 fig. Refs. not given.

After discussing the literature on the subject of ovarian pregnancy, the author notes that, in his series of 100 extra-uterine pregnancies in a 5-year period, two definite cases of ovarian pregnancy have occurred and 2 further cases which were histologically unproved. Reports of the 2 proven cases are given. Both were sent into hospital as cases of acute appendicitis. In 1 partial oöphorectomy was performed while in the other the tube and ovary were removed. It is felt that, if all cases of ovarian bleeding were examined histologically, ovarian pregnancy would be found to be more frequent than is generally supposed.

Josephine Barnes

LABOUR

164. **The Trained Obstetrical Patient.**
By J. C. PORTNUFF. *Amer. J. Obstet. Gynec.*, **67**, 268-272. Feb. 1954. 5 refs. 5 tables.

This is a report on 222 private patients who voluntarily took part in a training programme for child-bearing along the lines laid down by Grantly Dick Read and Helen Heardman. It was found that the trained patients stay at home longer than untrained before admission to hospital when labour starts, because they are more com-

fortable and less anxious. Thus 16 per cent of the primiparas and 55 per cent of the multiparas spent less than 3 hours in hospital before delivery—an important matter from the point of view of both nursing hours and room accommodation. Spontaneous delivery occurred in 35 per cent of primiparas and 73 per cent of multiparas. All the 222 patients received an anaesthetic of some sort —pudendal block, with or without trilene, general or spinal, but 80 per cent were conscious at delivery.

The author thinks that while his figures do not make an incontestable case for training for child-bearing they do suggest that labour may be shorter and less painful. Most patients expressed their delight at their participation in the exciting phenomenon of childbirth, and nurses are impressed with their behaviour, asserting that it is easy to pick out the trained patient from her deportment during labour and delivery. *F. J. Browne*

165. **Course of Labour in Elderly Primiparae.**

By S. STAMER, *Acta obstet. gynec. scand.*, **33**, 16-28. 1954. 15 refs. 10 figs.

This study deals with the influence of the foetal size on the course of labour in 255 primiparae aged 36 years and over, who were observed at the Lying-In Department A of the Rigshospitalet in Copenhagen. Only women with normal pelvic measurements who produced babies weighing at least 2,500 g. have been included. In 128 cases the birth weight was between 2,500 g. and 3,100 g., and in 127 cases over 3,100 g.

In the larger foetal weight-group labour was more prolonged (by an average of about 5 hours) and there were more obstetric complications, especially intra-uterine asphyxia and threatening intra-uterine asphyxia (40 cases in the larger weight-group as compared with 13 cases in the smaller), maternal birth injuries (13 and 2 cases respectively), post-partum haemorrhage (17 and 13 cases respectively) and intra-partum pyrexia (9 and 2 cases respectively). Surgical intervention was required 3 times as often, and the total foetal loss was 7·9 per cent as compared with 2·3 per cent in the smaller weight-group. Puerperal pyrexia was more common (27 and 8 cases respectively), and there was considerably greater risk of phlebitis of the legs and of pulmonary infarction (13 cases in the larger and none in the smaller weight group).

Three of the 255 elderly primiparae died; the cause of death was thrombophlebitis and pulmonary infarction, eclampsia and cerebral haemorrhage, and septicaemia respectively; none of these 3 patients, however, may be said with certainty to have died because of the large size of the foetus, the respective birth weights being 3,600 g., 3,000 g. and 3,200 g.

In the author's opinion induction of labour is indicated in an elderly primigravida if the foetus is estimated to weigh over 3,000 g.

[Antenatal estimation of the foetal weight is notoriously inaccurate. The author does not state if he advocates medicinal or surgical induction of labour; not a few obstetricians will certainly hesitate to accept these criteria for surgical induction in elderly primigravidae.] *N. Alders*

166. **The Progesterone Content of Human Placentas Before and After the Onset of Labour.**

By A. L. HASKINS. *Amer. J. Obstet. Gynec.*, **67**, 330-338. Feb. 1954. 29 refs. 5 figs. 4 tables.

Pregnanediol is excreted in the urine during pregnancy in increasing amounts but just before the onset of labour the excretion decreases, and after delivery the urinary pregnanediol rapidly returns to non-gravid levels. The origin of progesterone in the placenta after the third month is generally accepted, and further proof of it is found in women with full-time abdominal pregnancy. If the foetus is removed and the placenta left in situ, the urinary excretion of pregnanediol continues. Placental death, as manifested by the absence of secretion of chorionic gonadotrophin, is rapidly followed by decrease in the excretion of pregnanediol to non-gravid levels.

The author criticizes the current theories of the onset of labour especially the view that it is due to uterine distension, and points out that rabbits at term treated with progesterone have oversized foetuses but do not go into labour till progesterone is withdrawn; also removal of the foetus from the monkey uterus leaving the placenta in situ results in delivery of the placenta at term despite the lack of uterine distension.

The present investigation was designed to determine whether there was a measurable difference in the progesterone content of the human placenta before and after labour. Two groups of placentas were used (1) from healthy women delivered by Caesarean section before going into labour; (2) from healthy women after natural delivery. The method of extraction and analysis is given in detail, the recovered steroid compound being identified as progesterone by rabbit intra-uterine assay with resultant progestational proliferation of the endometrium.

The results showed that the mean placental concentration before the start of labour was twice that after labour. Since progesterone disappears rapidly from the blood stream it follows that these patients would have had a considerable reduction in circulating progesterone at labour, and this is offered as additional evidence that progesterone deprivation is a cause of labour.

F. J. Browne

167. **The Contracted Outlet.**

By D. F. KALTREIDER. *J. Amer. med. Ass.*, **154**, 824-827. Mar. 6, 1954. 5 figs. 10 refs.

From the Department of Obstetrics, University of Maryland, the author analyzes 1,866 cases of vertex delivery from which abnormal presentations and disproportion above the outlet had been eliminated. Difficult deliveries due to outlet contraction in these cases were assessed as those in which (1) excessive traction was necessary; (2) rotation, if indicated, was difficult; (3) Caesarean section was done; and (4) the infant showed evidence of intracranial haemorrhage. The sum of the interspinous and posterior sagittal diameters estimated by radiological means was found to be more accurate than the same estimation by clinical methods, but an even better prognostic value was found by radiological measurement of the lower anteroposterior diameter. The interspinous diameter was also tested and gave a fairly

good indication of midplane difficulty. Although from the anatomical point of view the midplane and the outlet can be defined, in the management of the patient they cannot be separated. The results are shown in graph form, but the course of labour cannot be predicted in this way alone and Caesarean section in cases of suspected difficulty is not justified without a trial of labour.

In the management of patients with suspected midplane and outlet contraction, after eliminating abnormal presentations, the spontaneous onset of labour is awaited. When there is delay in the midplane or outlet a trial of forceps is made and, if there is lack of descent with gentle traction, the patient is delivered abdominally by lower segment or extraperitoneal Caesarean section, but in order for this type of management to be acceptable as many uninjured infants as possible must be delivered vaginally.

Before this line of management was followed, in 1,189 cases of vertex delivery 292 cases were delivered by the forceps and 7 Caesarean sections were done without attempts at vaginal delivery. The foetal death rate was 4·5 per cent and 5 infants were injured. In a later group of 810 cases when trial of forceps was employed there were 133 indicated forceps deliveries and in 5 of these Caesarean section was done after a trial of forceps. There were no foetal deaths, but 2 infants had signs of intracranial haemorrhage and 2 were affected by shoulder dystocia. The author concludes that the trial of forceps method is a better procedure for the sake of the infant in cases of midplane and outlet contraction than vaginal delivery by excessive traction.

D. W. James

168. **Abruptio Placentae.**

By E. W. PAGE, E. B. KING and J. A. MERRILL. *Obstet. & Gynec.*, **3**, 385-393. Apr. 1954. 7 tables. 29 refs.

The authors point out that severe grades of abruptio placentae are accompanied by systemic effects. These include a type of shock which is frequently out of proportion to the degree of hypertension, a disseminated fibrin embolism, an in vivo defibrination of the blood leading to uncontrollable haemorrhage, an ischaemia of the renal cortex, and an activation of a fibrinolytic system in the plasma. These events may result from the escape of materials from the placental separation site into the maternal circulation.

Three series of abruptio placentae cases are presented which illustrate the reasons for conservatism in the mild grades, the value of immediate Caesarean section in reducing foetal mortality in the moderate grades, and the hazards of delay in delivery in the severe grades.

J. G. Dumoulin

169. **The Usefulness of Intravenous Pitocin Infusions in Obstetrics.**

By E. W. PAGE. *West. J. Surg. Obstet. Gynec.*, **62**, 125-134. Mar. 1954. 1 fig. 24 refs.

The author gives a review of the literature on this subject and points out that pitocin is one of the most potent drugs known, less than one molecule being required for each muscle fibre of the gravid uterus to produce a contraction; the threshold of sensitivity may vary 100 fold in different patients and there is therefore no standard dose. He advocates a test dose for each patient: graded doses of 1 in 10 diluted pitocin are given intramuscularly at ½-hourly intervals until adequate contractions occur; for every 0·2 ml. of this dilute solution, 0·2 ml. pitocin are added to 1 litre of glucose solution and given intravenously at 15-60 drops a minute. It is convenient to have a Y-tube in the drip apparatus so that 200 mg. of pethidine in 500 ml. glucose solution can be given as required for sedation (about 50 mg. are given every few hours). The infusion is continued through the 2nd and 3rd stages of labour; as soon as the infant's head is born the pitocin is run in at a rapid rate and, after delivery of the placenta, ergometrine is injected into the drip tubing. It is stressed that the most important requisite of the technique is the attendance of the physician; if the infusion is stopped, oxytocic activity ceases within 2-3 minutes owing to the action of a pitocin-destroying enzyme present in the plasma.

The results of 68 replies to a questionnaire are persented. The author's colleagues report that in a minimum of 3,500 deliveries there were no maternal deaths and 5 foetal deaths due to the method. There were 17 cases of foetal distress.

The author concludes that the method is indicated in atonic uterine inertia, the induction of labour and the prevention of post-partum haemorrhage. The contraindications are cephalo-pelvic disproportion, predisposition to uterine rupture, predisposition to thromboplastin or amniotic fluid embolism (dead foetus and accidental haemorrhage), hypertonic patterns of labour and inability of the physician to be in attendance.

D. C. A. Bevis

170. **Intravenous Pitocin Drip Induction of Labour in Preeclampsia. Report of Five Cases.**

By R. W. FULSHER. *West. J. Surg. Obstet. Gynec.*, **62**, 231-234. Apr. 1954. 15 refs.

Intravenous pitocin infusions were used in 5 patients to induce labour between the 35th week and term. Fifteen drops a minute of 1:1,000 Pitocin in 5 per cent glucose solution were given and if necessary the rate of infusion was increased. The method appears to be safe and the patients were established in labour within about 8 hours. The blood pressure was unaffected by the Pitocin, presumably because the modern product is relatively pure.

D. C. A. Bevis

171. **Use of "Partergin" as a Stimulant to Uterine Contractions.** (Partergin als wehenförderndes Medikament bei Geburten.)

By T. BRUNILA. *Ann. chir. gynaec. fenn.*, **43**, 50-59. 1954. 9 refs.

Partergin (methyl ergometrine in solution for use orally) has been used in 433 cases for the induction of labour or stimulation of weak uterine contractions. In two-thirds of these cases a successful result was obtained

attributable to Partergin. No toxic effect was noticed on the mothers. There were 3 cases of stillbirth attributed to its use, but in all these the recommended dosage had been exceeded or there had been previous evidence of foetal distress. The dosage was 5 drops followed in half an hour by 10 drops, one hour later 15 drops and a further hour later 15 drops. Total 45 drops in a day. The dose may be repeated the following day but no more should be given. Throughout administration the foetal heart should be checked and a watch kept on uterine tone between pains. Partergin is contra-indicated in cases where there is foetal distress or the mother is toxaemic.

D. M. Sheppard

172. **The Use of Large Doses of Progesterone in Delaying the Onset of Labour after Premature Spontaneous Rupture of the Membranes.**

By E. Eichner, K. Kunin, M. Linden, I. Goldberg, L. Salinger and Z. Peller. *Amer. J. Obstet. Gynec.*, **67**, 339-341. Feb. 1954. 3 refs.

By bed rest and the administration of progesterone and antibiotics 9 surviving infants were obtained in 27 patients whose membranes ruptured between the 20th and 30th weeks of gestation. The dose of progesterone was 200 mg. intramuscularly to a total of 400 to 600 mg. daily for the first 2 or 3 days. For the next 3 to 5 days the dose is reduced to 100 mg. twice daily and then to 100 mg. daily if the patient remains in hospital—if not, an attempt is made to give this dose 2 or 3 times weekly. This was not always possible but complete bed rest was advised. No opium derivatives are given as they were found to lead to rapid emptying of the uterus. It is considered that antibiotics make the continuation of pregnancy safe for the mother.

F. J. Browne

173. **The Problem of the Uncomplicated Breech.**

By D. R. Neilson and R. P. Neilson. *West. J. Surg. Obstet. Gynec.*, **62**, 153-165. Mar. 1954. 2 figs. 33 refs.

The authors review the results to 564 babies presenting by the breech at the Emanuel Hospital, Portland, Oregon. There were 64 deaths (15·7 per cent) among these but complicated corrections reduce this to 4 deaths (1·1 per cent) in 365 uncomplicated cases. Out of these cases, 58 were "problem" cases and the results in these two groups are contrasted. Primiparity produces difficulty but maternal age seems to be of less importance. Infants over 8 pounds in weight are likely to be difficult to deliver. Pelvic contraction will produce trouble as will prolonged rupture of the membranes. Slow engagement of the breech and prolonged labour also raise the risks to the foetus. The authors conclude that, if there is a combination of these problems in any one case, a Caesarean section is advisable.

D. C. A. Bevis

174. **The Prognosis in Breech Presentations when there is Deflexion of the Foetal Head.** (Le pronostic des attitudes défléchies de la tête foetale dans la présentation du siège.)

By L. Gernez and C. Poiret. *Bull. Féd. Soc. Gynéc. Obstét.*, **5**, 573-581. 1953. 37 refs. 4 figs.

Three cases are described of breech presentations showing gross deflexion of the head (confirmed radiologically) which persisted after delivery; the first was delivered by Caesarean section, the second underwent spontaneous version and was delivered normally, the third was delivered spontaneously as a breech without difficulty.

In all 3 cases the existence of an abnormal position of the head was discovered radiologically and after delivery the deflexed position of the head of the baby was maintained for some time.

The writers were able to collect 31 indisputable cases of marked deflexion of the foetal head in breech presentations from the literature.

In 3 of these spontaneous version occurred prior to the onset of labour and the infants were born as vertices, 2 spontaneously and 1 by forceps.

In 10 cases Caesarean section was carried out at term or before the onset of labour. In 4 of these indications other than the deflexed head justified the operation. Rhesus incompatibility, pelvic disproportion, and 2 cases of elderly primigravidae were the added indications.

Five live satisfactory children resulted; 1 child survived despite anterior dislocation of the first 3 cervical vertebrae over the 4th. Of the 10 children born by Caesarean section, 9 were normal and only 1 was malformed.

Finally in 18 cases delivery as breech presentations occurred. Thirteen infants were born alive without apparent malformation. Three succumbed at birth to meningeal haemorrhage or to spinal lesions; 2 babies survived, 1 showed malformation of the legs, 1 division of the spinal cord at the level of the first thoracic vertebra.

The authors refer to the writings of Gibberd who attributes the deflexed attitude to spasm or hypertonus of the extensor muscles of the foetus.

D. Maxwell

175. **On the Effect of Certain Obstetric Factors and Especially of the Routine Prophylactic use of Oxytocic Drugs on Post-partum Haemorrhage in Vaginal Deliveries.**

By K. Soiva. *Ann. chir. gynaec. fenn.*, **43**, Supp. 1, 7-116. 1954. 166 refs. [In English.]

This is a remarkably full survey of haemorrhage occurring in association with delivery in a series of 14,184 deliveries between 1948 and 1952 including full statistical details.

In the first part of the series 6,564 cases were treated conservatively, i.e., oxytocics were only given when indicated by post-partum haemorrhage except in some 476 cases where they were given prophylactically. The second part of the series deals with 7,620 deliveries where oxytocics were administered prophylactically immediately after the birth of the child.

The following conclusions were reached: Prophylactic oxytocics reduced the mean bloodloss at delivery by one-third and the incidence of post-partum haemorrhage by one-half. Intravenous administration was considerably more effective than intramuscular but the nature of the drug used (Methyl ergometrine, neogynergen, pituitrin) appeared to be immaterial. With the use of oxytocics,

the incidence of manual removal of placenta rose from 1·8 per cent to 2·2 per cent and there was a slight rise in the incidence of torn placentae and incomplete membranes; also a slight rise in incidence of mild puerperal infection but a diminution of severe infection. Oxytocics had no significant effect on blood pressure after delivery or on post-partum thrombosis. Puerperal anaemia was naturally much less.

The effect of administration of oxytocics was diminished if a multipara had complications in previous deliveries, if the baby weighed more than 4,000 g. or the placenta more than 750 g. and if, in addition, there was a prolonged second stage, toxaemia, oedema, varicose veins or if the third stage lasted more than 30 minutes.

With regard to the causes of post-partum haemorrhage in normal cases the following conclusions were reached: There is an increased tendency to blood loss in primiparae over 30 years of age where the height and weight differ markedly from the average, or where there have been complications in previous deliveries. Where the second stage has lasted more than 90 minutes in a primipara or 20 minutes in a multipara, where the third stage is longer than 30 minutes, the baby weighs more than 4,000 g., or the placenta weighs more than 750 g., the incidence of post-partum haemorrhage is higher. Parity does not increase the incidence of post-partum haemorrhage, neither does the length of the first stage or low implantation of placenta play any significant part. A slight increase in incidence of haemorrhage was seen where there was hypertension or oedema in a multipara or where a primipara had varicose veins or whose pregnancy was prolonged past term. *D. M. Sheppard*

ANAESTHESIA

176. **Observations on Pain Relief during Childbirth.** (Beitrag zur Schmerzlinderung unter der Geburt.)

By W. Guggisberg. *Gynaecologia, Basle*, **137**, 265-268. Apr. 1954.

The use of Largactil in childbirth has been investigated. Largactil is the hydrochloride of chloro-3(dimethylamino-3 propyl) 10 phenothiazine with the chemical formula $C_{17}H_{19}N_2SCl,ClH$.

It is used in surgery to combat shock and also in combination with narcotics. It has a powerful influence on the autonomic, central and peripheral nervous systems in that it is vagolytic, sympatheticolytic, antipyretic, antiemetic and sedative. It has been used in childbirth in combination with an analgesic for the following purposes:

1. To promote twilight sleep during the first stage.
2. To relieve pain.
3. To assist dilatation of the cervix through its spasmolytic effect.

The method used consisted of giving the drug by continuous intravenous infusion through an indwelling polythene catheter. One ampoule containing 50 mg. of Largactil and one ampoule containing 100 mg. of Dolosal (Pethidine) were added to 500 ml. of glucose solution; this mixture was given at the rate of 30 to 50 drops per minute.

Observations were made in 25 primigravidae. In 16 cases very good results were obtained; in 5 cases good results were obtained while the method failed to give relief in 4 cases. There was one post-partum haemorrhage of 900 ml. Three of the infants showed signs of blue asphyxia but there was no foetal mortality.

It is concluded that Largactil is useful for enhancing the action of narcotics in labour. It is difficult to prove if in fact labour was shortened.

It has also been found that Largactil is effective in the treatment of hyperemesis gravidarum and it is being given to ambulant patients. *Josephine Barnes*

177. **Spinal Anesthesia in Obstetrics. Report of Eight Thousand Cases.**

By B. H. Watson. *West. J. Surg. Obstet. Gynec.*, **62**, 284-293. May 1954. 2 figs. 19 refs.

The author reviews the results obtained at St. John's Hospital, Los Angeles, between 1943 and 1953. Since 1946 anaesthetics in the obstetrical department have been given by a group of obstetricians with training in anaesthetics and they have been able to advise their less experienced colleagues if obstetric difficulties arise during the delivery. Approximately equal numbers of spinal and inhalation anaesthetics are used and no deaths have been attributable to anaesthesia. The usual contra-indications to spinal are observed but, in addition, frank or anticipated bleeding, known cord pathology and fear of spinal are included. Breech presentation per se is not considered to be a contra-indication. Most patients receive premedication with varying dosage of pethidine, scopolamine and seconal. Spinal anaesthesia is induced when the cervix is about fully dilated, 35-50 mg. procaine (in 10 per cent solution) being injected at L3-4 or L4-5 using a 22-gauge needle with the bevel directed upwards. The blood pressure is recorded every 2 minutes and the patient put flat on her back with a pillow under the head. If a bloody tap is obtained, other methods of anaesthesia are used.

The author claims that manual rotation and forceps extractions are easier under spinal and that the patient being conscious helps in her delivery. The main disadvantage seems to be headache but no cases of nerve damage have occurred. If hypotension develops, the author states that the blood pressure rises if the uterus is pushed to one side and its weight removed from the vena cava. Two cases of aseptic chemical meningitis are described and were thought to be due to the use of a detergent in cleaning the syringes.

The author concludes that spinal anaesthesia is safe if carefully and intelligently given. *D. C. A. Bevis*

178. **Continuous Caudal Analgesia. Experiences in the Management of Disordered Uterine Function in Labour.**

By G. Trevor Johnson. *Brit. med. J.*, **1**, 627-629. Mar. 13, 1954. 7 refs.

The results are reported of the use of continuous caudal analgesia in the treatment of 74 cases of prolonged labour. The aim was to block the sacral plexus as it lies in the sacral canal and to extend the level of analgesia upwards in the extradural space to the level of the 10th dorsal segment.

The cases were collected over 3½ years and included all types of discoordinated action of the uterus or cervix which had prolonged the first stage of labour beyond 48 hours. After an infant was lost early in the series it was realized that caudal analgesia was unsuitable if disproportion were suspected or the head not fully engaged. Treatment was not begun until the cervix was at least one-third dilated.

The technique followed that described by Hingson and Edwards (*J. Amer. med. Ass.*, **121**, 225, 1943). A malleable needle was used which together with the rest of the apparatus can be obtained from Messrs. Thackray, Ltd. The anaesthetic agent was 1·5 per cent piperocaine hydrochloride ("metycaine") in Ringer-Locke solution. An initial dose of 40 ml. of piperocaine was injected immediately after a vaginal examination followed by a maintenance dose of 15 ml. half-hourly. The patient was turned from one side to the other after each dose to maintain a bilateral effect. After 6 hours a second vaginal examination was made. In 45 cases the cervix was fully dilated; of these 27 required simple outlet forceps, 16 required rotation and forceps and there were 2 breech extractions. All infants survived except one stillborn from intracranial injury at breech extraction and another who died of pneumonia on the 4th day.

Nineteen patients showed improvement after 6 hours but had not reached full dilatation. Analgesia was continued until full dilatation, which was achieved in an average of 9 hours (maximum 14 hours). In this group all were delivered of surviving infants, 9 by simple low forceps, 9 by forceps after rotation and one spontaneously.

The third group comprised 10 cases where 6 hours of analgesia effected no increase in the dilatation. Lower segment Caesarean section was carried out in all cases. Nine infants did well but 1 died within a few minutes of delivery, and the death was attributed to an error of judgment early in the series, for the head was not engaged when caudal analgesia was given and a contraction ring developed.

Technical ability and confidence in the method increased as the investigation proceeded, until finally it was considered that caudal analgesia could be achieved in 80 per cent of cases attempted. Local sepsis became the main contra-indication.

The high foetal salvage rate and the good condition of the infants at birth, despite foetal distress in 29 cases before the analgesia was started, may have resulted from improved placental blood supply following blocking of the autonomic connexions of the uterine arterioles.

Doreen Daley

LACTATION

179. Clinical and Chemical Studies in Human Lactation. VI. The Functional Capacity of the Breast.

By F. E. HYTTEN. *Brit. med. J.*, **1**, 912-915. April 17, 1954. 3 figs. 17 refs.

The author from the Midwifery Department, University of Aberdeen wished to determine any relationship between the size of the breast and its functional ability. A method of water displacement was used to study breast size. A perspex container was used fitting closely to the average chest wall round the breast, with an inflatable rubber cushion to form a seal. After filling with water from the highest point, the water was drawn off and measured. Usually only the left breast was measured. Measurements were made on the seventh post-partum day immediately following complete emptying of the humalactor in 86 primiparae and 23 multiparae. In 11 patients measurements were also made during the course of pregnancy, beginning at the third month. A history of breast reactions during the menstrual cycle was obtained from 50 of these patients.

There was a significant correlation between breast size and seventh day yield. There was no correlation between breast size and any of the major constituents of milk.

Only 20 per cent of those questioned had noticed any pre-menstrual breast changes. The mean seventh-day yield in these was 573 ml., and for the remaining 80 per cent—430 ml.—the difference being statistically significant.

Results from the 9 primiparae measured at intervals during pregnancy showed high correlation between the pregnancy enlargement and seventh day milk yield. There was no relationship between the initial size of the breast and its subsequent enlargement. The author points out that the small breast may suffer from the double disability of both diminished production and diminished capacity—lactation becoming unsatisfactory when the infant has outgrown the supply the breast can secrete or store.

Eileen Wilson

180. A Contribution on the Treatment of Hypogalactia with Red Light.

By V. CUNDERLIK. *Gynaecologia, Basle*, **137**, 192-197. Mar. 1954. 5 refs. 1 fig.

The general routine used for promoting successful lactation is described. This consists of care in general health, local treatment to the breasts, use of galactagogues such as prolactin, oestrins, thyroxine and stilboestrol and testosterone together, and care during delivery.

In cases where milk production is insufficient the breasts are irradiated with infra-red rays, at a distance of 4 inches for 20 to 30 minutes. A distinct improvement in milk production has been noted in cases so treated. The authors speculate as to whether this is due to the effect of the rays themselves or to the psychological effect. Good results have been obtained with engorged breasts but this preliminary clinical experience requires experimental confirmation.

Josephine Barnes

INFANT

181. A Survey of the Rh Problem in Toronto, 1947-1952.

By W. L. DONOHUE, M. A. MULLINGER, E. G. COOK and C. E. SNELLING. *Amer. J. Obstet. Gynec.*, **67**, 233-247. Feb. 1954. 18 tables. 9 refs.

This is a review of work on the Rh factor done in all the Toronto hospitals from 1947 to 1952 inclusive. The results showed that, even if the husband is homozygous

and an infant had been born with erythroblastosis that was severe enough to cause death, occasionally a subsequent infant with an apparently milder form of the disease might survive and be normal even though it was Rh positive. To offer complete protection in transfusion against C, E, c and e factors is hardly practical at present. One precaution, however, can be taken to protect women against possible isoimmunization with one of the rare blood types, namely, that no woman should be transfused with her husband's blood, no matter how compatible their bloods may appear. There was evidence that sensitization by transfusion is less likely to occur before puberty than after. ABO incompatibility seems to protect against Rh immunization to some extent, possibly because ABO incompatible foetuses are aborted early in pregnancy.

As for treatment there was very little to choose between exchange and simple transfusion, the case mortality being 16 per cent in each group. There was, however, a lower incidence of kernicterus in the exchange group, namely 3·9 per cent compared with 6·5 per cent, and exchange transfusion is, therefore, with the possible exception of mild cases, the treatment of choice. The highest mortality was among premature infants and, unless there are obstetrical indications, the pregnancy should be allowed to go to term.

Kernicterus is the most dreaded sequel of erythroblastosis and though replacement transfusion has reduced its incidence it has not eradicated it. Though almost invariably it is associated with severe jaundice, neurological changes in the form of mental retardation turned up in 2 children whose cases were considered too mild to warrant any form of treatment.

Since 1951, when ABO testing became routine in all cases of haemolytic anaemia suspected of being due to ABO incompatibility, there have been 18 cases of erythroblastosis due to that cause; 11 infants survived and were normal, 1 had kernicterus, 4 were stillborn, and 2 died. It is concluded that the haemolytic disease, when it occurs, is no less severe than that due to Rh incompatibility. *F. J. Browne*

182. **Premature Delivery in Haemolytic Disease of the Newborn.**

By H. B. Watson, V. M. Crosse and W. L. F. Hatchuel. *Brit. med. J.*, **1**, 679-680. Mar. 20, 1954. 5 refs.

The authors consider that there are definite clinical indications for the premature delivery of some infants suffering from haemolytic disease despite the condemnation of induction of labour in recent papers. Suitable cases are those women with a history of 2 or more stillbirths from haemolytic disease, a homozygous Rh positive husband and diminution of foetal movements. In such cases it may be possible to treat successfully a premature baby and the only alternative is stillbirth. Daily observation of the patient in the last weeks of pregnancy and complete cooperation of obstetrician and paediatrician are essential. Details of an illustrative case are recorded.

The mother's history is that she had a 28-weeks stillbirth in 1939, a 24-weeks abortion in 1941 and a 38-weeks stillbirth in 1943, after which she was transfused, apparently uneventfully, with blood that was probably Rh-positive. The fourth pregnancy in 1945 ended at 36 weeks, the stillborn infant having a spina bifida. Rhesus antibodies were first noted early in the next pregnancy and she developed mild toxaemia before she had another stillbirth at 36 weeks in 1950. She was blood group A Rh-negative and her husband belonged to group O Rh-positive (probably CDe/cDE). Blocking antibodies were present in the sixth pregnancy which proceeded normally until the 33rd week. Then she stated that "the baby moves as if it tired" and that a similar change in foetal movements had occurred before foetal death in the past. Accordingly, a Caesarean section was carried out at once and a living baby weighing 4 pounds 6 ounces was delivered. Haematology showed him to have a haemoglobin of 4·8 g. per cent and a positive Coombs' test. The blood group was O Rh-positive. An immediate exchange transfusion was given (430 ml.) and, during the following month, 3 small simple transfusions. At 21 months he was normal in every respect. The following year the story was very similar. At 34 weeks the movements lessened and immediate section resulted in delivery of a male infant weighing 3 pounds 10 ounces, group O Rh-positive and Coombs' test positive. The haemoglobin was 6·5 g. per cent, 600 ml. blood were exchanged and further transfusions given on the 18th and 60th days. At 7 months he was normal.

[This patient was indeed fortunate that her last 2 pregnancies were managed so well that they resulted in living infants after 4 stillbirths and a late abortion. However, it is difficult to conclude from the story that premature termination of pregnancy is necessarily the right treatment when isoimmunization is the only abnormality, for here other factors are involved of sufficient seriousness to cause death in utero apparently before antibodies were present in the maternal blood.] *Doreen Daley*

183. **Haemolytic Disease of the Newborn caused by a new Rh Antibody, anti-C^x.**

By F. Stratton and P. H. Renton. *Brit. med. J.*, **1**, 962-965. Apr. 24, 1954. 3 tables. 7 refs.

Rh-positive mothers occasionally give birth to infants suffering from haemolytic disease; in the majority of these cases the maternal serum contains Rh antibodies anti-E or anti-c. Rarely other antibodies may be responsible, either unusual Rh variants or other blood-group antigens such as anti-Kell.

In the case described, severe haemolytic anaemia occurred in a third child, the mother having first delivered a normal child and then a premature stillbirth. The infant's haemoglobin fell to 22 per cent on the 18th day but he progressed well after four blood transfusions. Mother, father and infant were all group A Rh-positive. The child's cells gave a strongly positive Coombs' reaction and direct tests between the father's cells and the mother's serum showed an unusual antibody. After investigations had been completed it appeared that this was an allele of Rh at the C-c locus and has been named C^x. Anti-C^x

antibody gives very few positive results when tested with random blood samples from the English population. Out of 3,931 tested, only 4 positive results were obtained. Inheritance of the antigen as a Mendelian dominant character was, however, demonstrated.

The desirability of including direct tests between the paternal cells and the maternal serum in any case suspected of haemolytic disease is emphasized, as well as the need for extensive investigations on antibodies thought to be reacting with family blood groups.

[A great variety of antigenic tests, the details of which will be more comprehensible to the haematologist than to the average obstetrician, were carried out before the above important conclusions were drawn.]

Doreen Daley

184. **Cortisone Therapy in Rh Incompatibilities.**

By O. B. HUNTER. *J. Amer. med. Ass.*, **154**, 905-908. Mar. 13, 1954. 4 figs. 7 refs.

The great variation in haemolytic disease apparently unrelated to maternal antibody titre suggests that other factors are involved. In acquired haemolytic disease in the adult it has been shown that the use of cortisone and corticotrophin (ACTH) tends to inhibit the haemolysis of the red cells affected. This led the author to study the effect of cortisone upon haemolytic disease of the newborn, and observations were made upon the correlation of haemolysis of red cells and adrenal cortical involution which is often found in an infant with a positive Coombs' test. Poor pregnanediol excretion results from poor placental development, and this would be expected in foetal haemolytic anaemia. It is suggested that the estimation of pregnanediol and also of 17-ketosteroids in the maternal urine is of value in reflecting foetal adrenal cortical function as well as the placental function.

A study was made of 67 women with antibody titres higher than 1:8. Pregnanediol and 17-ketosteroid excretion rates were estimated from the 20th week onwards and when these failed to show the normal rise treatment with cortisone was started. The usual amount of cortisone was 25 mg. every 6 hours but this was increased if the hormone levels in the urine did not rise. Toxic effects other than oedema were minimal but in every case sodium was restricted. A few of the newborn showed evidence of fluid retention with subsequent loss of weight in the first few days and an exchange transfusion was usually necessary to complete the therapy.

The mode of action of cortisone is not entirely clear, but as the Coombs' test on Rh positive infants was still positive after cortisone therapy it seems that although union of antigen and antibody occurs it does not lead to haemolysis. The author claims that this therapy has reduced the mortality rate of babies born alive from 10 per cent with exchange transfusion alone to 3 per cent. The incidence of stillbirths was reduced from 17 per cent to 5 per cent. [The foetal loss for the type of case described in this paper is certainly very low, but many other workers have been unable to confirm the supposed beneficial effect of cortisone in Rh sensitization.]

D. W. James

185. **Asphyxia Neonatorum.**

By L. O. S. POIDEVIN. *Med. J. Aust.*, **1**, 836-837. May 29, 1954. 3 refs.

All aspects of the subject are discussed. The part played by drugs, and anaesthesia especially if not administered carefully, in the production of asphyxia is stressed. For the baby that does not breathe immediately or shortly after birth the author advocates aspiration of the oropharynx, placing the baby in a slightly head-low position, and careful handling.

He also advises that the baby with asphyxia should be placed in an incubator at a temperature of 91°-93° F. with an oxygen flow of 4 litres per minute and a maximum oxygen atmosphere not in excess of 60 per cent.

Three milligrammes of α-lobeline should be injected intramuscularly.

Mention is also made of the failure of "conditioning for pulmonary respiration" sometimes encountered in babies born by Caesarean section.

S. Devenish Meares

186. **Prevention and Treatment of Asphyxia Neonatorum.**

By P. B. CUSACK and C. A. CUSSEN. *J. Irish med. Ass.*, **34**, 90-95. Apr. 1954. 21 refs. 4 figs.

The prophylaxis of asphyxia neonatorum is usually regarded as being a problem of better obstetrical care but in the authors' view there are two measures, which if used before delivery, will help the infant.

(1) Increased oxygen supply to the mother, which will improve the oxygen supply to the foetus.

(2) Analeptics given to the mother to make the infant more susceptible to stimuli after birth.

The treatment of established asphyxia neonatorum is very varied, ranging from simple clearing of the passages to elaborate active procedures; the authors claim that their method of dealing with the established condition is simple and rational.

Asphyxia neonatorum is anticipated in the following types of case:

(1) Where there is foetal distress during labour. (2) Where there is difficult or prolonged labour. (3) Where the mother had received heavy dosage of sedative drugs.

In these cases prophylaxis is attempted and the first step is to administer oxygen to the mother by means of a B.L.B. mask with a 10-litre flow. The authors attach great importance to the administration of oxygen, and believe that although the foetus can withstand anoxia to a greater extent than the adult, irreparable harm may be done and the risk of cerebral haemorrhage is considered to be raised significantly by a period of intrauterine anoxia. The second step is the administration of analeptic drugs to the mother in the hope that the infant will be born with a respiratory centre more susceptible to stimuli; nikethamide and d-N-methylamphetamine were used by the authors. Nikethamide is stated to produce "the awakening effect" and is also a respiratory stimulant, while d-N-methylamphetamine, in addition to being a stimulant, elevates blood pressure.

Since October 1952, the authors have used this form

of prophylactic treatment in 150 consecutive instrumental or operative deliveries. Three infants suffered from severe asphyxia at birth, 5 had mild asphyxia, and all the others breathed in one minute or less. The small number of cases in the series is acknowledged but it is the authors' impression that, without oxygen and analeptics, the number of cases of asphyxia would have been significantly increased.

For the treatment of established asphyxia neonatorum the following three points are considered to be of importance: (1) The airway must be clear. (2) Oxygen must be brought to the blood stream. (3) Oxygenated blood must be brought to the brain.

Clearing the air passages. The baby is placed in a cot in the horizontal position and mucus extraction is carried out with a soft rubber catheter attached to a "trap mucus extractor".

Getting oxygen to the blood stream. When the baby fails to breathe at once after the airway has been cleared, a small pharyngeal airway is inserted and, by means of a face-piece and a reservoir bag connected to an oxygen supply, an attempt is made to inflate the lungs. Where stored oxygen is not available, mouth-to-mouth artificial respiration is advised.

Getting oxygenated blood to the brain cells. The baby is placed in a resuscitating cot which can be rocked to an angle of 45° in the foot-down or head-down position. The baby's hands are extended above the head and cuffs are placed on the wrists and ankles to hold the baby in position. The cot is then rocked, starting with the foot-down position; each position is held for 4 seconds. The authors believe that the treatment of established asphyxia neonatorum may fail when the foetal circulation is inadequate; the rocking method described is said to enhance foetal circulation. *J. K. Russell*

187. **Augmented Respiration. An Emergency Positive-Pressure Patient-Cycled Respirator.**

By I. DONALD. *Lancet*, **1**, 895-899. May 1, 1954. 2 tables. 3 figs. 4 refs.

The author describes in detail an emergency type of apparatus used for dealing with asphyxiated newborn infants. The apparatus provides 50 per cent oxygen with nitrogen under positive pressure through a soft rubber resuscitative mask. This pressure is applied automatically to coincide with the beginning of an inspiratory effort. The inspiratory effort is therefore augmented at a time when the gases are more likely to pass into the lungs rather than the alimentary tract. When there is no inspiratory effort on the part of the infant, intermittent positive pressure can still be applied mechanically.

The results of the use of the apparatus are briefly described. No claim is made that recovery of surviving infants is due wholly to the use of the respirator. Attention is drawn to the possibility of pulmonary damage and in one case this was found at autopsy. The positive pressure to the lung can be regulated and the normal pressure used was 15 cm. of water.

The object of the apparatus is to combat asphyxia temporarily and so allow the infant time to achieve normal respiration if it is capable of doing so.

H. H. Fouracre Barns

188. **Intestinal Obstruction in the Newborn.**

By V. A. J. SWAIN and N. E. FRANCE. *Lancet*, **1**, 844-849. Apr. 24, 1954. 6 tables, 7 figs. 17 refs.

The authors record their experiences with 32 consecutive cases of intestinal obstruction giving rise to symptoms in the first 4 weeks of life. The cases include only small bowel and large bowel obstruction, pyloric and anorectal obstruction having been excluded. They illustrate the pathology, clinical features and treatment of duodenal, jejunal and ileal atresia and stenosis, meconium peritonitis, meconium ileus, intussusception, peritoneal bands and Hirschsprung's disease.

Straight X-ray of the infant's abdomen is an invaluable aid in the diagnosis and in determining the site of the obstruction. Treatment is in the main surgical with special attention to the fluid and electrolyte balance of the infant.

H. H. Fouracre Barns

OBSTETRIC OPERATIONS

189. **"Failed Forceps": A Review of 100 Cases.**

By R. LISLE GADD. *Brit. med. J.*, **1**, 735-737. Mar. 27, 1954. 7 figs. 7 refs.

This is an analysis of 100 consecutive cases of failed forceps admitted to St. Mary's Hospital, Manchester, between January 1943, and December 1951. The incidence fell from 3·2 per cent of emergency cases in 1943 to 0·5 per cent in 1951. The causes of failure are divided into 8 groups; when more than one cause was present, the more important one was classified.

Group 1. Cervix not fully dilated (39 cases). After expectant treatment, full dilatation failed to occur in 6 of these and delivery was by Caesarean section in 4, craniotomy in 1 and internal version followed by breech extraction in another. Of the rest, 6 were delivered spontaneously and 27 by forceps. Six babies were dead on admission and 8 more were subsequently lost. All mothers survived.

Group 2. Occipito-posterior position (22 cases). Failure of manual rotation and a funnel pelvis indicated section in 1 case and craniotomy was performed in the only case in this group where the infant was dead on admission. Of the others, 1 was delivered normally, 18 by forceps after rotation and 1 by forceps face to pubes. Four babies delivered by forceps succumbed to cerebral haemorrhage, 2 before and 2 after delivery. One maternal death was attributed to shock.

Group 3. Deep transverse arrest (11 cases). All were treated by manual rotation and forceps. Nine infants survived, 1 was dead on admission and the other stillbirth was caused by shoulder dystocia.

Group 4. Brim disproportion (7 cases). Three were successfully delivered abdominally. Two high forceps deliveries resulted in stillbirth and destructive operations were performed in the other 2 with a dead baby on admission. The average weight of the babies was 9 pounds 4 ounces, and this rather than pelvic contraction tended to cause the trouble.

Group 5. Outlet contraction (7 cases). In only 1 case was bony disproportion confirmed and a difficult forceps delivery resulted in stillbirth. Soft-tissue resistance appeared to have caused the failure with the others and all were successfully delivered by forceps after episiotomy.

Group 6. Hydrocephalus (3 cases). All were perforated after admission.

Group 7. Brow presentation (2 cases). One infant survived after Caesarean section. The other was dead on admission and was delivered with great difficulty after craniotomy. Hysterectomy was necessary for extensive uterine rupture. Both mothers survived.

Group 8. Aetiology unknown (9 cases). Eight were easily delivered vaginally and all these babies survived. The remaining patient died on the second day with a ruptured uterus; her doctor had performed internal version and partial breech extraction after his forceps had failed. The head was delivered easily after admission. The rupture was not suspected until she was unfit for surgery.

In these 100 cases, 2 mothers and 28 babies were lost and there were 18 cases of notifiable pyrexia.

Prophylaxis involves every accoucheur remembering the standard criteria for successful forceps delivery. The abdomen should always be examined to exclude the hydrocephalic which has so moulded that the head is not fully engaged even though it is visible at the vulva.

If the cervix is palpable, it is wise to abandon immediate forceps delivery except in a multipara with a small and easily dilatable rim.

Principles of treatment include immediate shock therapy where indicated, abandoning vaginal delivery if moderate traction is ineffective, antibiotics, relief of dehydration, skilled anaesthesia and exploration of the uterus after delivery to exclude damage.

The fall in the number of cases of failed forceps is ascribed to improved antenatal care, better obstetric teaching and the appointment of new consultants in outlying areas.

Doreen Daley

190. **Subsequent Caesarean Sections.**

By V. L. WARD. *West. J. Surg. Obstet. Gynec.*, **62**, 222-229. April 1954.

The author considers the dictum "once a Caesarean, always a Caesarean" and bases his conclusions on the results of 163 operations. He thinks that the crucial problem is deciding whether the uterine scar will rupture and agrees that the classical (upper segment) operation leaves a defective scar and probably justifies elective operation in subsequent pregnancies. After the lower segment operation, when the indications for it are non-recurring, vaginal delivery may safely be attempted. The key to the situation is obviously clinical judgment. In his own series of cases the author delivered 62 per cent with non-recurring primary indications by the vaginal route, more it appears than other authors have reported. There was 1 case of ruptured uterus but the mother survived.

D. C. A. Bevis

GYNAECOLOGY

191. **Oral Cortisone Treatment of Hypopituitarism.**

By H. L. SHEEHAN and V. K. SUMMERS. *Brit. med. J.*, **1**, 723-725. Mar. 27, 1954. 23 refs.

Four cases were studied, 3 with a typical post-partum hypopituitarism and one man where the origin of the syndrome was unknown. All were observed originally for 2-3 weeks without treatment and for 5 weeks when they were given 3 gr. of thyroid siccum daily. This produced no significant effect. They were then given oral cortisone 12·5 mg. daily for 1-2 weeks followed by 25 mg. daily for 2-4 weeks. Trial of higher dosage produced psychological disturbances and subsequent maintenance dosage of 12·5 mg. daily was the rule.

Cortisone was found to have a similar but greater effect than testosterone in improving physical strength and mental activity, but did not usually restore bodily hair. The best results were obtained by giving a combined course of both substances and later continuing cortisone as above.

Doreen Daley

192. **Hirsutism.**

By M. VESELL. *Obstet. & Gynec.*, **3**, 307-313. Mar. 1954. 7 refs. 4 figs.

Following a brief discussion of the subject, the author presents 4 cases of hirsutism. One was a female pseudo-hermaphrodite, possibly with adrenal cortical hyperplasia. The second was advised an adrenal gland exploratory operation, having been diagnosed as adrenal hyperplasia: she refused, and later gave birth to a healthy child. The third underwent left adrenalectomy because of an adrenal adenoma, and the fourth had an oöphorectomy for arrhenoblastoma.

J. G. Dumoulin

193. **Damage to Posterity Caused by Irradiation of the Gonads.**

By H. J. MULLER. *Amer. J. Obstet. Gynec.*, **67**, 467-483. Mar. 1954. 14 refs.

Spontaneous mutations are estimated to occur in man in 1 in every 5,000 genes, and as the mutations are almost always detrimental they result in at least a 20 per cent risk of genetic extinction, and a corresponding loss of fitness in the average person. The fitness of the race would thus diminish if it were not that the tendency is corrected by natural selection, by sterility, or death before reproductive age is reached.

Artificial gene mutation is induced by X-ray radiation and it is estimated that 85 r of radiation to the gonad would double the frequency of spontaneous mutation with a corresponding increase for larger doses, the frequency of mutation being exactly proportional to the dose received by the gonad. There is no evidence of a threshold dose, and all doses no matter how small carry some risk. It has also been found that it is only the total accumulated dose, not its intensity or duration of application, that counts in determining the frequency of mutation received by the offspring. Experiments with fruit flies (*Drosophila*) have shown that 3,000 r induced

in each germ cell on the average approximately 2 detrimental mutations. The data thus far reported on the effects of radiation on human beings are irrelevant to the issue because of complete lack of genetic method in interpreting their results. Using modern methods it is possible to calculate the minimum amount of damage to posterity by any given amount of radiation received by the gonads of a person who will later reproduce, even though that damage is too elusive even to be recognized, by reason of its being spread so thin over so many descendants, and at the same time mingled with the damage caused by generations of spontaneous mutations.

As an example of how the mutations will affect posterity in a particular case let us suppose that 255 r of X-rays had been delivered to a woman's ovary for the purpose of inducing ovulation, and that owing to the "success" of this treatment she produced 2 children who rated as normals and continued her line. Accepting the conclusion that a dose of 85 r results on the average in one induced mutation among every 5 gametes, the dose of 255 r would cause 3 mutations in every 5 gametes. Hence the 2 eggs which gave rise to the 2 children of the exposed woman would in the average case contain 1·2 induced mutations. That is, at least 1 of her 2 children would usually carry a newly induced mutation.

It should no longer be possible to doubt the conclusion that detrimental mutations are being produced in highly significant numbers by such doses of radiation as are used for the instigation of ovulation, and that their frequency, as indicated by present knowledge, is so high that the harm entailed by such a procedure exceeds the benefit.

F. J. Browne

194. **Third Generation Follow-up of Women Treated by X-ray Therapy for Menstrual Dysfunction and Sterility Twenty-eight Years Ago, with Detailed Histories of the Grandchildren Born to these Women.**

By I. I. KAPLAN. *Amer. J. Obstet. Gynec.*, **67**, 484-490. Mar. 1954. 11 refs.

The author does not accept the conclusions of Muller about the injurious genetic effects of irradiation of the ovaries for sterility (see abstract 193) as he does not think that results obtained in flies are necessarily applicable to man. He has followed up for 28 years a number of women whose ovaries and pituitary he irradiated for sterility. Of 660 treated women he was able to trace 441, of whom 270 had become pregnant. These have given birth to 347 apparently normal children. Twenty of these children have married and between them have produced 14 grandchildren, all of whom are mentally and physically normal.

In the author's opinion these results indicate that irradiation, when properly used, is harmless to the treated woman and to her progeny's offspring, and no adverse genetic effects are noticeable in either the second or third generation of such irradiated women.

[This paper, while valuable, does not quite answer Muller's contention. Muller claimed that the injurious mutation would not in the first generation result in premature death or sterility, but it would nevertheless give the child some slight handicap that would tend to go on down the generations until it fulfilled its predestined role, and the line of descent is ultimately eliminated. The question seems to be: do we care for remotely future generations or not?]

F. J. Browne

195. **The Treatment of Female Infertility by X-ray Therapy.**

By S. PAYNE. *West. J. Surg. Obstet. Gynec.*, **62**, 173-176. Mar, 1954. 12 refs.

The results are presented from the Shelton Clinic, Los Angeles, of the treatment of 61 infertile patients in whom ovarian dysfunction appeared to be a major factor. All these patients had resisted the usual forms of treatment and irradiation was commenced on the 3rd or 4th day of uterine bleeding and repeated at 5-7 day intervals for 3 treatments. If the pituitary and ovaries were both being treated, therapy was given to both areas at the same sitting. Treatment to the ovaries each consisted of 75 r and to the pituitary 75-100 r. Since the response to the X-rays seems better when the genitalia are fairly normal, each patient was given stilboestrol sufficient to produce at least one episode of withdrawal bleeding. If the menses were overdue, care was taken to exclude pregnancy before irradiation. Ovulation sometimes occurred after 1 or 2 treatments. Of 29 patients with fairly regular menses but impaired ovulation or corpus luteum formation, 23 showed improvement and 11 became pregnant. Nineteen patients had secondary amenorrhoea for 3 months to 13 years; 15 were improved and 9 became pregnant. Two patients with primary amenorrhoea were treated, 1 was improved. Three cases of pituitary exhaustion following first deliveries were treated: 1 promptly became pregnant, another became pregnant after 2 series of treatments. There was improvement in menstruation in 5 of 6 patients with the adreno-genital syndrome and 4 conceived; the incidence of abortion was very high, however. The selection of cases for this treatment is important, women over the age of 35 do not generally respond and patients with previous extensive surgery to the ovaries sometimes get amenorrhoea. Primary amenorrhoea is a forlorn hope but this treatment is about all that can be offered. There would appear to be general agreement that low-dosage irradiation is effective but its mode of action is obscure. In general the fear of ill effects of irradiation on later generations seems to have been overemphasized. Care should be taken not to irradiate a young developing embryo.

D. C. A. Bevis

196. **The Male Factor in Sterility and Abortions.**

By R. D. MCBURNEY. *West. J. Surg. Obstet. Gynec.*, **62**, 295-303. May 1954.

The author relates his experience at the University of Southern California School of Medicine over the past 13½ years. Specimens of semen are examined within 2-3 hours and their normality of count, morphology and motility judged from experience. If an abnormality is discovered, the patient is sent to a urologist for further examination and treatment. In 183 men examined because

of sterility of the marriage, 69 per cent had subnormal semen. Few men were willing to be examined following their wives' abortions but, of 49 cases, the semen was subnormal in 60 per cent.

The clinical impression is that the male partner is responsible for sterility and abortion in at least half the total number of cases and that he must be educated to accept his part of the blame and be encouraged to undergo examination.

D. C. A. Bevis

197. **Clinical Approach to Infertility.**

By J. K. RUSSELL and A. P. B. MITCHELL. *Lancet*, **1**, 1161-1162. June 5, 1954. 3 refs.

The authors in a short article using 3 cases as examples draw attention to the need for regard for the emotional reaction of patients investigated for infertility. Imprudent handling of the case of infertility may bring much unhappiness and tension to the marriage. They maintain that discretion and tact are needed in deciding how much information is given to patients after investigations have been completed. The knowledge that the husband or wife is subfertile should be balanced against the value of the treatment that can be offered. When the value of treatment is aequivocal, the authors see no advantage in placing responsibility clearly on one or other partner. The plan of management of the infertile couple as carried out at the Royal Victoria Infirmary, Newcastle-on-Tyne, is briefly described.

H. H. Fouracre Barns

198. **Conservative Treatment of Genital Actinomycosis with Penicillin.** (Konservative Behandlung von genitaler Aktinomykose mit Penicillin.)

By B. SZENDI. *Gynaecologia, Basle*, **137**, 161-171. Mar. 1954. 10 refs. 4 figs.

The rarity of genital actinomycosis is noted and 2 cases are described. In the first, that of a 41-year old woman, a fistula developed after puncture of the posterior fornix to explore a large pelvic mass. Actinomyces were found in the discharge from the fistula and the intradermal test was positive. Treatment was with massive doses of penicillin and potassium iodide.

The second case also presented with a pelvic mass. This case was also successfully treated with penicillin and potassium iodide in massive doses.

The difficulties encountered in diagnosis of these cases are discussed. Treatment should be conservative and should consist of large doses of penicillin.

Josephine Barnes

NEW GROWTHS OF THE REPRODUCTIVE ORGANS

199. **Observations on the Pathology and Morphology of Pre-cancerous Lesions of the External Genitals of the Female.** (Osservazioni sulla patogenesi e sulla morfologia delle lesioni precancerose nei genitali esterni femminili).

By C. MOSSETTI and G. FANZAGO. *Minerva ginec., Torino*, **6**, 109-115. Feb. 28, 1954. 11 figs. 26 refs.

Seven cases of leucoplakia, kraurosis, and vulvar epithelioma are examined with regard to their histological characteristics, well illustrated by sections. The differing views of various authors are considered and contrasted as to the relationship of leucoplakia and kraurosis to epithelioma.

In the authors' view it is only the hypertrophic form of leucoplakia, which, together with kraurosis, is precancerous in character. In the development of cancer the sub-epithelial connective tissue has an almost decisive role.

W. C. Spackman

200. **Observations on the Pathology of Primary Carcinoma of the Vagina and its Relation to Therapy.**

By G. W. DOUGLAS. *Surg., Gynec. Obstet.*, **98**, 456-466. Apr. 1954. 12 figs. 13 refs.

Knowledge of the behaviour of carcinoma of the vagina is deficient largely on account of its rarity and the scarcity of suitable pathological material.

The author has collected 8 cases admitted to Bellevue Hospital and the University Hospital, New York, during the period 1944-1952. All were treated surgically by partial or complete colpectomy associated with radical hysterectomy and removal of the regional lymph nodes. The bladder was removed in 2 and the rectum in 1 case. Six cases have survived, the longest period of survival being 8 years.

In 4 instances the growth was papillomatous, consisting of greatly thickened folds and furrows of squamous epithelium projecting upward from the surface with limited invasion at the base. Three tumours were infiltrating in type with marked down-growth and lateral spread beneath intact surface epithelium. The single instance of surface carcinoma was flat and for the most part intra-epithelial in extent.

The mode of invasion differed from that of carcinoma of the cervix in that down-growth by single cells and small strands and clumps of cells was common and it is suggested that this may have been due to the more elastic consistency of the sub-epithelial tissues in the vagina.

Three tumours were well differentiated and 2 showed slight or moderate degrees of differentiation and 3 were anaplastic.

In 2 specimens there was evidence of contact spread.

In both the infiltrating tumours of the anterior vaginal wall penetration had occurred with invasion of the bladder wall. In tumours situated on the posterior vaginal wall there was no instance of penetration of the underlying fascia.

It is interesting to note that in no case was tumour found in the deeper lymphatics of the vaginal wall. Moreover, no tumour was found in the parametrial or pelvic nodes in any of the 6 specimens in which these tissues were available for study. The series is too small to permit a conclusive statement regarding the frequency of lymphatic spread to regional nodes and the stage of the disease at which it occurs. However, it would appear to be a less frequent and a later manifestation than is currently believed.

It is the personal opinion of the author that every patient with this disease should be considered as a

candidate for radical surgery before radiation therapy is resorted to. The extent of surgery must be planned to fit the individual case. Total removal of the vagina is advised by a combined abdominal and vaginal dissection. Removal of the uterus, adnexa, parametria and a block dissection of the pelvic lymph nodes are necessary for both therapeutic and prognostic reasons. In the advanced case extending into the lower third of the vagina, vulvectomy and dissection of the inguinal nodes may be indicated as well. Removal of the bladder or rectum may be required when these structures are involved, but study of the specimens in this series indicates that the rectum may be uninvolved despite the presence of extensive tumour in the overlying vagina.

John P. Erskine

201. **Hemangiopericytoma of the Uterus.**

By P. PEDOWITZ, L. B. FELMUS and D. G. GRAYZEL. *Amer. J. Obstet. Gynec.*, **67**, 549-563. Mar. 1954. 1 table. 14 figs. 22 refs.

Haemangiopericytoma is a rare tumour of which 144 cases have been reported, only 9 of them uterine. In the present article the authors describe 4 new cases.

It is characterized by numerous proliferating capillaries, surrounded by radially arranged round or ovoid cells, probably derived from pericytes—cells that are normally found on the outer surface of capillary walls. The tumours vary in size from microscopic lesions to 20 cm. or more in diameter and may occur as solitary nodules or diffusely involve the uterine wall, and extend by finger-like prolongations into lymphatics and broad ligament. They have no true capsule, and on section vary in colour from grey-white to yellow, lacking the cyanotic red appearance usual in vascular growths.

Microscopically, the pericytes are round, oval or spindle shaped, and are arranged concentrically around the capillaries. A differential stain, such as Masson's, is necessary to distinguish them from smooth muscle cells. The stain shows the presence of connective tissue fibres around and between the pericytes, as well as the absence of myofibrils which are characteristic of smooth muscle cells; and whereas muscle cells stain orange-yellow, pericytes are green. Careful examination will almost always reveal areas of proliferating capillaries but a silver stain may be necessary to demonstrate them, as they may be compressed by the pericytes. With the silver stain the sheaths of the blood vessels stain black.

The clinical features are not distinctive. Ages ranged from 25 to 77 and the usual symptom was abnormal vaginal bleeding. The uterus was enlarged in 2 of the patients and a diagnosis of submucous fibroid was made in the other 2. Of the 144 cases previously reported 80 per cent were benign and 20 per cent malignant, but the benign or malignant nature cannot be determined histologically but only by the future clinical course. Recurrence took place in 2 of the authors' 4 cases, 1 with local invasion and the other with metastasis. In young women who want children, enucleation with wide excision is permissible, in others hysterectomy.

These tumours have been reported previously under different names including stromatous endometriosis, stromal myosis, sarcoma, perithelioma and haemangio-endothelioma. The authors consider it likely that stromal myosis and haemangiopericytoma are identical tumours, and argue the matter in 4 pages.

F. J. Browne

202. **Endometrial Biopsy as a Standard Diagnostic Technique.**

By J. A. WALL, G. H. FLETCHER and E. J. MACDONALD. *Amer. J. Roentgenol.*, **71**, 95-101. Jan. 1954. 7 figs. 3 refs.

It is suggested that endometrial biopsy is a valuable diagnostic aid in malignancy of the body of the uterus, its advantage as opposed to routine curettage being the non-requirement of admission to hospital. A negative biopsy is followed by a formal curettage. Of 445 biopsies confirmed later by curettage or hysterectomy, cancer was present in 95 and there were only 3 patients in whom the diagnosis was missed. Of these 3 individuals, in 1 both biopsy and curettage were negative, hysterectomy revealing the presence of a uterine polyp undergoing carcinomatous change, in another a small area of a thick polypoidal endometrium was considered to be neoplastic, and in the third insufficient tissue was removed to be of practical value. Biopsy, which is often carried out in the doctor's office, is thorough, all sides of the uterine cavity being covered consecutively. Hysterectomy is preceded by radium insertion, the uterine dosage being 4,000 r units in two divided doses with additionally a pericervical application of 3,000 r units at the first sitting, administered by means of Manchester ovoids in the lateral fornices, and a vaginal application of similar dosage on the second occasion. In 26 patients having had adequate pre-operative irradiation, no tumour was found in the hysterectomized specimen in 65 per cent; a tumour with marked changes microscopically was present in 23 per cent, while in 13 per cent the residual growth was active. [This latter item illustrates the advisability of employing both irradiation and operation routinely in all forms of cancer where such combination is possible.]

J. H. Mulvany

203. **Evaluation of the Efficiency of Various Intra-uterine Radium Techniques in the Treatment of Cancer of the Corpus Uteri.**

By J. H. FREED and E. P. PENDERGRASS. *Amer. J. Roentgenol.*, **71**, 253-266. Feb. 1954. 5 figs. 5 tables. 41 refs.

The value of pre-operative radium in endometrial cancer still remains controversial. In histopathological studies of the uterus after irradiation, areas of radiation necrosis may lie adjacent to areas of carcinoma scarcely damaged although the subjacent myometrium and vessels show radiation changes. The purpose of the paper is to consider the various methods of radium application to the endometrium and to evaluate their relative efficiency from the physical and biological standpoints. The short tandem containing 60 mg. radium is shown to cover mainly the lower half of the uterus; the long tandem with 100 mg. irradiates the length of the uterus but not uniformly so on account of the shape of the intra-uterine

space. The wire technique of Crossen, employing three tandems containing 30, 20 and 20 mg. respectively, remedies somewhat this deficiency; but the best method is thought to be that of multiple small packing, as advocated by Heyman, the containers being small enough to permit contact irradiation of the entire uterine wall. Dosage in the latter method varies between 7,000 and 15,000 gamma Roentgen-units. The result of a study of dose distribution at selected points about the external wall of the uterus is given together with the reported incidence of residual tumour in operative specimens and of the 5-year survival rate. It is shown that the reported incidence of residual cancer varied from 50-91 per cent when intra-uterine tandem was used; from 47-54 per cent with various special applicators, and decreased to 25 per cent following the use of a packing technique. Great variation was also shown to exist for the 5-year survival rate. Recurrence is most frequent in the vaginal cuff, the vagina or abdominal wound. It is suggested that 6 weeks is the optimum period for hysterectomy after pre-operative radium.

J. H. Mulvany

204. **Radiation Treatment of Carcinoma of the Corpus Uteri.**

By W. E. Costolow, J. F. Nolan, G. C. Budenz and L. Du Sault. *Amer. J. Roentgenol.*, **71**, 669-675. Apr. 1954. 6 figs. 7 refs.

This study was undertaken to ascertain, if possible, any direct relationship between the clinical results of radiation therapy in the treatment of carcinoma of the body of the uterus and the dose delivered. 248 patients with this disease, who had been treated at the Los Angeles Tumor Institute between the years 1933-1951, were available for study and, of this number, it was possible to evaluate the effectiveness of radiation therapy in 200 as judged by estimation of the dosage delivered to an arbitrary point in the parametrium situated about 5 cm. up from the external os and close to the outer uterine wall. In the early days, treatment had consisted of radium given by an intra-uterine tandem containing 50 mg. plus 3 vaginal tubes of 25 mg. each applied to the fornices; but, more lately, multiple capsular implantations had been employed, giving a dosage of about 7,000 mg. hours, followed, in those cases not intended for hysterectomy, by external Roentgen therapy of about 2,000 r units given through 4 pelvic ports. In assessing the time-dose values of irradiation at the given point, it was possible to draw a line upon a graph above which it was considered that the dosage given had been adequate and below which of less than minimal therapeutic value. It was found, in regard to 100 patients recorded above the line as having had adequate dosage, that 49 per cent showed a 5-year cure, whereas of 100 patients, whose treatment was recorded below the line as having been inadequate, only 19 per cent were alive and well at the end of 5 years. It was noted, however, relative to the minimal dose line, that the percentage of success preserved an equivalent ratio for all stages of the disease including those where extension beyond the body of the uterus had occurred.

J. H. Mulvany

205. **The Significance of Colposcopy in the Diagnosis of Carcinoma of Cervix, Based on the Author's own Material.** (Znaczenie kolposkopii w przypadkach raka szyjki macicy oparte na materiale wlasnym.)

By A. Lubelski. *Ginek. polska*, **25**, 15-20. Jan./Mar. 1954. 28 refs.

The author discusses the value of the colposcope in the diagnosis of carcinoma of the cervix, presenting a series of his own cases diagnosed by colposcopy.

After evaluating the significance of colposcopy, supplemented by cervical biopsy, he discusses the diagnosis of carcinoma of cervix by vaginal smears and compares it with his own results.

His conclusion is that colposcopy, supplemented by biopsy, is the more reliable method for securing an early diagnosis of carcinoma of the cervix.

S. H. Riterband

206. **Treatment of Cancer of the Cervix Uteri: A Comparison of Radiation Therapy and Radical Surgery.**

By G. H. Twombly and H. C. Taylor. *Amer. J. Roentgenol.*, **71**, 501-508. Mar. 1954. 1 fig. 26 refs.

Two groups of about 40 patients, thought to be Stage I or II cancer of the cervix, were made up as nearly alike as possible by the alternate selection of patients who attended hospital for treatment. It was intended that one group should be treated with surgery and the other by radiotherapy; but the surgical group also received both pre-operative and post-operative irradiation, although of lesser degree than the other. Of the surgical group about one-third was subsequently found to be unsuitable for surgery on medical grounds or extension of growth beyond Stage II, as determined by further clinical examination or at laparotomy; and one other was alive with cancer at the end of the 5-year period. Of the remaining number, 28, there were 22 alive and well at the end of 5 years, yielding a cure rate of 79 per cent. Cases in this group received intravaginal cone Roentgen therapy in four doses of 500 r units to the cervix before operation and post-operative pelvic irradiation of 2,000 r units through each of four to six ports, plus 3,000 r units through a vaginal cone. Total dosage 13,000 to 17,000 r units.

Of the group intended for radiation alone, treatment consisted of external pelvic irradiation as above for the surgical group together with a dose of 4,500 r units through each of three intravaginal ports, the combined dosage being 25,500 r units. In addition, a cervical radon container containing 100 mc was inserted for 30 hours after the Roentgen therapy had been completed. In this group of 44 cases, there were 7 instances of radiation proctitis progressing to fistula in one and to stricture in another, and 6 with severe cystitis, 2 developing ulceration and 1 a vesicovaginal fistula. Excluding 2 deaths from intercurrent disease, there were 30 cases alive and well at the end of 5 years out of 42, a cure rate of 71 per cent.

There would thus seem to be little difference between the two groups of cases, but the writers felt that irradiation was more successful as it was able to deal with all cases, including those unsuitable for operation.

[The article illustrates the comparison of surgery plus irradiation rather than surgery alone versus radiotherapy.]

J. H. Mulvany

207. **Integral Roentgen Therapy for Carcinoma of the Cervix Uteri.**

By J. A. DEL REGATO. *Amer. J. Roentgenol.*, **71**, 676-682. Apr. 1954. 7 figs. 5 refs.

The results obtained by different workers employing combined internal and external radiation show a wide variation in effectiveness, due partly to a failure to sterilize the growth at its extreme points of extension in the pelvis. It is suggested that an ideal irradiation of malignant tumours requires all potential areas of involvement to be treated with a homogeneous dose-distribution applied in small measures over a long period. It is claimed that the protracted delivery of the total dose is more effective than, and avoids the dangers of, a high concentrated dosage. Roentgen therapy only is employed, treatment comprising ten weeks' external irradiation (400 kv., 3 mm. Cu. and 80 cm. target skin distance) followed by intravaginal therapy (140 kv., 0·5 Cu., 25 cm. distance) given over a period of 12 days. The path and strength of the irradiation have been investigated on a full-size replica of the female pelvis built-up from sections of plywood 1 cm. thick so that the dosage can be calculated for any given point in the pelvis at all levels. From the information gathered in this way, a technique was evolved which delivers to the lateral walls of the pelvis an amount varying between 2,700-3,600 r units, while in the central (cervical) area the dosage was estimated to reach 8,000 r units. In 191 consecutive cases, comprising only 25 first stage and 65 second stage cases with 101 patients in stage III or IV, the overall survival rate for the five-year period was 39 per cent.

J. H. Mulvany

208. **A Flexible Rubber Applicator with a Positive Spread for Radium Treatment of Cancer of the Uterine Cervix.**

By P. A. BISHOP, *Amer. J. Roentgenol.*, **71**, 267-278. Feb. 1954. 9 figs. 29 refs.

In view of the persistence, after standard radium irradiation, of active metastases in the pelvic lymph glands secondary to carcinoma of the cervix, as determined at operation, an applicator is described designed to give adequate parametrial cover. A flexible rubber bar, 7 cm. in length, 3 cm. in vertical dimension and 1 cm. thick, is bored in four places (leaving an intact central zone of 12 mm.) to transmit eight radium tubes, of which the outermost are 6 cm. apart. A tandem stem for intrauterine irradiation is first introduced into the uterus and then the vaginal applicator, folded into a U-shape by a special holder which fits into the outer ends of the bar on each side, is passed into the vaginal vault. The bar is allowed to straighten out, the holder remaining attached, and is manœuvred against the cervix where it is held in position by vaginal packing and a perineal T-binder looped over the handle of the introducer.

It is considered that a low intensity source applied for longer periods is less likely to produce damage to the rectum and paracervical tissues from over-irradiation which can result from unintentional slipping of the radium. Computation of the depth dosage charts with various strengths of radium tubes has shown that the most effective arrangement consisted of 5 mg. tubes in the four central positions of the vaginal applicator and 10 mg. tubes in the four outer positions with three 10 mg. tubes in the uterine stem, comprising 90 mg. of radium in all left for 100 hours. The treatment is fractionated by division into two to four applications given over a period of 3 to 4 weeks. The course of treatment is checked by routine roentgenograms but is not usually followed by Roentgen therapy as it is thought that the dosage of 7,000 r units to the cervix and paracervical area is already adequate.

J. H. Mulvany

209. **Granulosa-cell Tumours and Brenner Tumours.** (Les tumeurs de la granulosa et les tumeurs de Brenner.)

By J.-C. NIDEGGER. *Gynaecologia, Basle*, **137**, 129-161. Mar. 1954. 56 refs. 8 figs.

This is a long and important review of granulosa-cell tumours and Brenner tumours of the ovary, based on the study of 13 granulosa-cell tumours and 5 Brenner tumours.

The clinical history of the 13 granulosa-cell tumours is given and in attempting a definition the authors note the wide variety in the histological appearances of these tumours. It is concluded that such tumours exist when the cellular structure consists of elements analogous with those of the ovarian granulosa. The macroscopic appearance of these tumours is very variable. In the present series the largest tumour weighed 10 kg., while the smallest was the size of an orange. The tumours are usually round or oval without adhesion to the surrounding structures. They are generally yellowish in colour, resembling the corpus luteum. Cystic cavities may be seen in the tumours which may be associated with ovarian cysts or teratomata. Ascites and Meigs's syndrome may be encountered. Metastases are rare but bilateral tumours sometimes occur.

Microscopical examination enables the tumours to be divided into four main groups: Folliculoid, insular, cylindromatous or trabecular and diffuse or sarcomatous. Preparations stained with silver salts show argentophil fibrils in the reticulum between the tumour cells. The "follicular oöphoroma" of Brenner does not show these structures and is thus of different origin. The author considers that the Brenner tumour is not a variety of the granulosa-cell tumour. The thecoma ("Loeffler-Priesel tumour") is considered to be closely related to the granulosa-cell tumour.

The histogenesis of granulosa-cell tumours is so far obscure but it is suggested that they may arise in cases where there is disorder of the anterior pituitary. In support of this it is shown that two peaks occur in the age incidence of granulosa-cell tumours, at 16 years and at 48 years, that is during periods of endocrine instability. The question of malignancy of granulosa-cell tumours is difficult to answer on histological appearances alone.

Clinical follow-up, with estimation of hormone output, will help to clarify this aspect of the problem. Granulosa-cell tumours are relatively infrequent, the incidence being estimated as between 0·9 per cent and 3 per cent of all ovarian tumours. By no means all of them exhibit endocrine activity and in the present series only 1 case out of 13 showed evidence of excessive production of oestrogens.

A clinical description is next given of the five Brenner tumours in the series. In all cases the typical histological structures were seen and the silver preparations showed that the argentophil reticulin-fibrils seen in the granulosa-cell tumours were absent. Brenner tumours may be solid or may present as part of a pseudomucinous cyst.

In Brenner tumours the epithelial islets vary in appearance but the tumour cells are typical, large, oval, polyhedral cells with abundant cytoplasm and easily visible cellular membranes. The epithelial islets may undergo cystic transformation. The stroma is fibrous, resembling that of the ovary itself. Blood vessels are scanty, yet necrosis is rare; calcification of the tumour is often seen. The origin is probably similar to that of the pseudomucinous cyst, to which the Brenner tumour is undoubtedly closely related. The histogenesis is believed to be from "Walthards' cell-nests".

Josephine Barnes

OPERATIONS

210. **Presacral Plexus Resection: Follow-up Results of Cotte's Operation.** (Sugli esiti a distanza della resezione del plesso presacrale secondo Cotte.)

By P. N. Siliquini. *Minerva ginec., Torino*, **6**, 73-79. Jan. 31, 1954. 74 refs.

The author relates the clinical details and follow-up of a small series of 20 cases observed for periods from 6 months to 3 years, and refers to the results of similar series by other operators. He does not go into details of operative technique which are in fact very important in this particular operation. Variation in technique accounts for the satisfactory results obtained by some operators and the failures by others in cases where a straight-cut unequivocal success would be confidently expected.

He records his results under the following heads: character and painfulness of menstruation, other forms of pelvic pain, fertility, sexual sense (effect on frigidity, etc.), efficiency in labour, and any other effects noted. He does not mention any special effects on the function of micturition which is sometimes temporarily disturbed.

In this series, the indications for which he operated and the additional procedures adopted (ventrosuspension, salpingectomy, ovariotomy, myomectomy) make the valuation of the procedure in his cases somewhat difficult to assess, but like almost all who have much experience of this operation, his results convinced him of its very considerable value for the relief of certain forms of pelvic pain, pre-eminent among which is intractable primary dysmenorrhoea.

W. C. Spackman

211. **Primary Complications in Abdominal Hysterotomy.** (Über die primären Komplikationen beim kleinen Kaiserschnitt.)

By R. Ojanen and K. Niemineva. *Ann. chir. gynaec. fenn.*, **43**, 17-28. 1954. 9 refs.

This is a review of the primary complications following abdominal hysterotomy in 551 cases occurring at the first and second Helsinki Women's Clinics between 1935 and 1951. Due to an increasing number of indications, the percentage of all laparotomies performed for hysterotomy rose from 3·4 (1935-38) to 10·2 (1950-51). The complications are dealt with in regard to age, parity, length of pregnancy, operation and primary indication for operation. A comparison is made between those cases performed before the introduction of antibiotics and those after; and with relationship to sedimentation rate and haemoglobin level. General mortality was 0·9 per cent; reduced mortality 0·18 per cent. The general maternal mortality of Finland was 0·22 per cent. The average percentage of cases with complications was 23·3. Only 3·6 per cent of complications were classed as severe—thrombosis, embolism, ileus, etc. Complications depended to a certain extent on age, parity, type of operation, but the nature of the primary illness appeared to exert no influence thereon.

D. M. Sheppard

212. **Hysterectomy. Observations on Complications.**

By G. F. Melody. *West. J. Surg. Obstet. Gynec.*, **62**, 235-241. Apr. 1954. 7 refs.

The author considers his results in 122 consecutive hysterectomies for the usual conditions; 5 were for carcinoma (2 Wertheims) and 10 were combined Caesarean-hysterectomies. There were 95 total abdominal, 18 subtotal abdominal and 9 vaginal. General anaesthesia was used in 67 and spinal in 55. Blood transfusion was used as required and care was taken to treat anaemia pre-operatively. No patients died but 64 became pyrexial after operation; 25 patients developed cystitis, 10 paralytic ileus and there was 1 case each of acute cholecystitis and volvulus of the small intestine. Eight patients had serious respiratory complications, all following general anaesthesia. There was 1 case of brachial plexus injury which subsided in 2 months. Three patients developed a haematoma in the abdominal wound and 1 of these ruptured and the patient developed a ventral hernia. There were 2 cases of secondary haemorrhage. Granulation tissue at the vaginal vault caused trouble in 19 patients and 3 patients developed a pelvic abscess. In 15 patients there were subsequent secondary operations related to the hysterectomy under review.

The author concludes that exploration of the abdominal viscera should be performed at the time of the hysterectomy, that spinal anaesthesia should be used and that bowel preparation with neomycin should be more frequent. The steep Trendelenburg position and "packing off" of the bowel should be abandoned and unabsorbable sutures used for closing the abdominal fascia (stainless steel in infection, cancer, etc.). Broad ligament haematomas should be treated expectantly unless infected.

D. C. A. Bevis

213. **A Detailed Study of 40 cases of Pure Ampullary Uterine Implantations.** (Étude détaillée de 40 cas purs d'implantation ampullo-utérine.)

By R. PALMER and G. PROUST. *Bull. Féd. Soc. Gynéc. Obstét.*, **5**, 548-551, 1953. 5 refs.

By "pure cases" the writers imply those where the only operative procedure on the tubes was either bilateral implantation or unilateral implantation with removal of the other tube. In 40 cases there were 13 pregnancies (32 per cent), 3 extra-uterine pregnancies (7·5 per cent), 10 with recurrent blockage (25 per cent), and 13 with apparent satisfactory patency but no pregnancy (32·5 per cent).

The writers consider it interesting to study the prognostic value of the kymograph tracings obtained after operations. Six types are described in detail.

Hystero-salpingography was carried out in 19 cases: in many lipiodol passed quickly and abundantly through the tube concerned.

In cases where a less viscous fluid medium was used, the uterine shadow was often absent.

The writers state they have no experience of isthmo-uterine implantations. In all these cases ampullary uterine implantation was performed even where the obstruction was at the cornu.

In all cases the stump of the ampullary portions of the tube were split into two small flaps about 4-5 mm. each in length, which were sutured using 0000 nylon. In 14 of their earliest cases a rubber ureteral sound had been passed from the tube into the uterus and was withdrawn at the end of the sixth day.

In 3 of the 14 cases where the ureteral sound was used, the implantation was carried out after anterior incision of the fundus of the uterus.

In 3 cases there was proven permeability and pregnancy resulted in 1 case, but there was herniation of the ovum at the eighth month in 1 case necessitating an emergency Caesarean section with a living child.

In 3 other cases the implantation was made without any uterine incision by making a passage in the neighbourhood of the uterine cornu using a trocar of the Sellheim type: 1 block recurred, 1 stenosis with tubal pregnancy, and 1 case of proven patency without pregnancy resulted.

In the other 37 cases the ampulla of the tube was implanted into a tunnel of the cornu, created by excision of a cylinder shaped piece of tube about 5 mm. in diameter, centreing in the interstitial portion of the tube.

In these 37 cases, 7 oscillating curves resulted when insufflated, with 3 intra-uterine pregnancies; 13 so-called "incontinent" curves were followed by 4 intra-uterine pregnancies, 1 case of stenosis and 7 apparent tubal blocks. *D. Maxwell*

214. **Suprapubic Vesicourethral Suspension as a Primary Means of Correcting Stress Incontinence and Cystocele.**

By C. GOETSCH. *West. J. Surg. Obstet. Gynec.*, **62**, 201-203. Apr. 1954. 6 refs.

The author reports the use of the Marshall-Marchetti operation at the same time as abdominal hysterectomy in 7 patients who had stress incontinence in addition to the primary uterine disease. The patient is prepared for both vaginal and abdominal procedures and, after placing a Foley catheter in the bladder, the legs are placed in sterile coverings and the lower end of the operating table draped with sterile towels. After completion of the abdominal procedure, the vagina is readily accessible to permit palpation of the needle placing sutures lateral to the urethra. The operation is easier than carrying out an anterior colporrhaphy and is well tolerated by the patient. The results in all 7 cases are described as very satisfactory. *D. C. A. Bevis*

215. **Ureteral Injury in Pelvic Surgery.**

By K. CONGER, C. T. BEECHAM and T. M. HORRAX. *Obstet. & Gynec.*, **3**, 343-357. Apr. 1954. 14 figs. 4 tables, 33 refs.

From Temple University Hospital, Philadelphia, comes this excellent article on a subject of great importance to all gynaecologists. In it are discussed the incidence, pathogenesis, symptoms and diagnosis, prophylaxis and treatment of injuries to the ureter resulting from pelvic surgery. When an injury to the ureter is recognized at operation, end-to-end anastomosis is carried out if the injury is high. This is done over a splinting polythene catheter which should extend up into the renal pelvis and out through the urethra, being secured in place by inserting a Foley catheter into the bladder to which it is tied. If the injury is low, re-implantation of the ureter into the bladder is the procedure of choice, also using a polythene and a Foley catheter. When bilateral ureteral ligation is recognized post-operatively, immediate laparotomy and direct repair of the injury is recommended. This is aided by previously passing a cystoscope and inserting ureteral catheters up to the points of ligation. After the development of a post-operative stricture or uretero-vaginal fistula, the first attempt at treatment should be by ureteral dilatation. If this fails, one of the above techniques should be carried out. Less desirable are ureterosigmoid anastomosis, ureterostomy, transuretero-ureteral anastomosis and nephrectomy. Ligation of the ureter is condemned. *J. G. Dumoulin*

NOTICES

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The Editor is: Professor James Young, D.S.O., M.D., F.R.C.S., F.R.C.O.G., Ashfield, Balcombe Road, Haywards Heath, Sussex.

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Double spaced typescript (not carbon copies) should be submitted. Italics in the text should in general be reserved for words in a foreign language and as little as possible used to indicate emphasis.

Proper scientific names giving both genus and species should be italicized, with an initial capital and contraction for the genus only after a full spelling at the first mention, thus:

Clostridium welchii followed by *Cl. welchii*; *Bacterium coli —Bact. coli*; *Mycobacterium tuberculosis—Myco. tuberculosis; Corynebacterium diphtheriae—C. diphtheriae.*

Each sentence should have its proper components thus:

"*Progress:* The patient continued to improve," NOT
"*Progress:* Went downhill."

The author's name, his decorations, degrees and relevant diplomas should appear at the head of the paper together with his appointment at the time of preparation of the text.

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These should be avoided as far as possible. "Per cent" should be used instead of the symbol "%" and such forms as T.B., R.B.C., B.P., P.E.T., A.P.H. eschewed.

Dates should be given as 10th May, 1946, and *not* 10.V.46. Numbers should be in the form of numerals and not words except when beginning a sentence, thus "Fifteen patients out of a total of 60 exhibited," etc. The official rather than the proprietary names of drugs must be used. The Journal convention is gr. for grains; g. for grammes; Kg.; ml. (*not* c.c. or c.cm.); mg.; pounds (*not* lb.); ounces (*not* oz.), etc., and wherever suitable the metric equivalent of an English measure should be given, for example, when recording pelvic measurements, size and weight of babies, tumours, etc.

When comparable figures are given, either the English or the metric mode must be followed, thus: the excretion of urine/24 hours should be shown in ml. (and not ounces) when the urinary or blood-urea is given in g./100 ml.

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Brown, H. E., and Jones, B. K. (1943): *J. Obstet. Gynaec. Brit. Emp.*, **2**, 128.

Sampson, P. (1940): *Obstetrics for Midwives*. 2nd edition. Fraser, London. p. 9.

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THE ROYAL COLLEGE
OF
OBSTETRICIANS AND GYNAECOLOGISTS

SILVER JUBILEE

ROYAL COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS

SILVER JUBILEE

THE Silver Jubilee Celebrations were held in London on 13th, 14th and 15th July.

The President (Mr. A. A. Gemmell) opened the proceedings on 13th July, and his Address, which was given in the Library of the College House, is reproduced in full on page 555. At the end of the Address the following gifts were received by the President:

From: the Australian Regional Council on behalf of the Fellows and Members in Australia—a Silver Salver and Cigar Lighter mounted on a Kangaroo's Paw.

From: the Canadian Regional Council on behalf of the Fellows and Members in Canada—a cheque for the Building Fund Appeal.

From: the New Zealand Regional Council on behalf of the Fellows and Members in New Zealand—a cheque for the Building Fund Appeal, and a George III Silver Salver made by James Ross.

From: the South African Reference Committee on behalf of the Fellows and Members in South Africa—a cheque for the Building Fund Appeal.

From: the Gynaecological Visiting Society of Great Britain—a cheque for the Building Fund Appeal.

From: the Gynaecological Club—a Centre Piece in Silver Gilt, consisting of three dishes engraved with the College coat of arms.

From: the Gynaecological Travellers—a cheque for the Building Fund Appeal.

From: the Women's Gynaecological Visiting Club—a cheque for the Building Fund Appeal.

In the afternoon of the same day, in the Senate House of the University of London (by the courtesy of the Vice Chancellor and Court of the University), the conferment of Honorary Fellowships took place.

In the evening there was a Reception, again in the Senate House, which was attended by Her Majesty Queen Elizabeth the Queen Mother, to whom a bouquet was presented by Miss Patricia Bell, a grandniece of the first President. The President and Mrs. Gemmell received the guests who included Honorary Fellows, Fellows and Members of the College and their ladies, from Australia, Canada, New Zealand, South Africa, India and Ceylon; representatives of the sister Colleges, of learned societies; many friends of the College, and a number of American gynaecologists on a visit to this country as the guests of the Gynaecological Visiting Society of Great Britain. Music was provided by the Band of the Royal Horse Guards (The Blues).

The Silver Jubilee Dinner was held on Wednesday, the 14th July at the Dorchester Hotel, and the celebrations ended with a Supper-Dance at the Hurlingham Club on 15th July.

LECTURES

Two lectures were given in the Barnes Hall of the Royal Society of Medicine by courtesy of the President and Council. On 14th July Sir William Fletcher Shaw gave the William Meredith Fletcher Shaw Memorial lecture entitled "The College: its Past, Present and Future". On 15th July Professor B. T. Mayes of Sydney, the Sims-Black Travelling Professor, gave the William Blair-Bell Memorial lecture entitled "The Making of an Obstetrician". Both lectures are printed in full.

The Admission of Honorary Fellows

The Honorary Fellowship of the College was conferred on the following eminent persons:

Lord Simonds, Lord Chancellor of England.
Dr. Doris Gordon, Stratford, New Zealand.
Dr. Joe Vincent Meigs, Boston, U.S.A.
Sir Arthur Sims, London and New Zealand.

Each was presented in turn by Professor R. W. Johnstone, whose Address is given in full on page 577.

After formal admission by the President, Dr. Joe Vincent Meigs returned thanks on behalf of the four Honorary Fellows.

The President then presented Badges of Office to the Chairman of the Australian Regional Council and, in the absence of their Chairmen, to the representatives of the Canadian Regional Council and the New Zealand Regional Council. To each of them and to the Chairman of the South African Reference Committee, the President presented an inscribed copy of the history of the College written by Sir William Fletcher Shaw. Each recipient made a speech of thanks.

The Silver Jubilee Dinner

The President and Mrs. Gemmell received the guests at the Dorchester Hotel. The function was graced by the presence of many distinguished guests. These included the Lord Chancellor of England and Lady Simonds, the Minister of Health and Mrs. McLeod, representatives of Overseas governments and representatives from the field of industry, to whom the College has reason to be grateful for contributions to its Appeal Fund for future development. There were, in addition, many distinguished guests from the medical world.

The Toast of the College was proposed by the Lord Chancellor.

Before the President replied to the Toast of the College, Sir William Fletcher Shaw handed to him a calf-bound copy of the history of the first twenty-five years* written by Sir William at the request of the Council, to commemorate the Silver Jubilee.

Professor J. M. Munro Kerr also presented a calf-bound volume of a book reviewing the history of obstetrics and gynaecology from 1800-1950† written by Professor J. M. Munro Kerr, Professor R. W. Johnstone and Professor Miles H. Philips and others, also to commemorate the Jubilee.

In making these presentations Sir William Fletcher Shaw and Professor Munro Kerr said that they did so as an expression of affection for the College. Both paid tribute to the publishers whose generosity had made the publication possible. The two presentation volumes are now in the College Library.

During the three days the College House was open to visitors. Some of the rare books from the College Library were on exhibition, and gifts of silver made from time to time and on the occasion of the Jubilee, were displayed in the Library.

The Silver Jubilee Appeal Fund

Her Majesty Queen Elizabeth the Queen Mother has sent a donation to the Silver Jubilee Building Appeal Fund of the College.

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* *Twenty-five Years, The Story of the Royal College of Obstetricians and Gynaecologists, 1929-1954*, by Sir William Fletcher Shaw (J. & A. Churchill Ltd. 21*s.* net).

† *Historical Review of British Obstetrics and Gynaecology 1800-1950*, edited by Professor J. M. Munro Kerr, Professor R. W. Johnstone and Professor Miles H. Philips (E. & S. Livingstone Ltd. 30*s.* net).

PRESIDENT'S SPEECH

at the Inaugural Ceremony on 13th July, 1954

We meet this morning to inaugurate the ceremonies and celebrations which have been arranged to mark our Silver Jubilee.

Let us give a few moments' thought to what is meant by Jubilee. It is a function established long ago, the holding and significance of which is set out in the Book of Leviticus. The English version of the Old Testament translates the Hebrew word as Jubilee and yet in a very literal sense the word means "sounding of horns".

According to the writer of that ancient book, this ceremony was to take place every fiftieth year and was to be ushered in by the sounding of trumpets on the tenth day of the seventh month. Now although the calendar has changed and the Council of the College did not consult Holy Writ when determining the time for our ceremonies, these have in fact fallen very close to the modern version of that date. A coincidence certainly, but one from which we may distil a certain moral strength.

As the Bible tells us that there should be a Jubilee every fiftieth year why are we holding a celebration after only 25 years? There is sanction of the Church for this too. The Roman Catholic church decreed in the fifteenth century that there should be an "ordinary jubilee" every twenty-five years.

In the various functions within and surrounding our programme there is considerable similarity with those of long ago. The trumpeting, suitably muted by a reasonable discretion we trust, will probably be sounded by the publicity which we understand the Press will give us, and this is to be supplemented by Dame Hilda Lloyd's talk on that modern trumpet, the wireless, this afternoon at the invitation of the B.B.C.

Liberty was to be proclaimed and the members of the family who had become bondmen were to be set free. Surely we can with full justification proclaim our freedom, and indeed from the very housetops. Our branch of medicine was in thrall until twenty-five years ago to the Physicians or Surgeons or both. Twenty-five years ago our founders established our charter of freedom and in the years that have passed we have proved that we are worthy of that freedom. Our much older sister Colleges have accepted us and themselves now insist that we take our place beside them in the highest Councils.

The presence amongst us of members of the College from the far countries overseas is a living sign of the active interest in the affairs of the College, so constantly and devotedly shown throughout the Commonwealth and accords with the idea that at the time of a Jubilee every man should return to his own family. I personally like to think of our College as a large family and have used this simile in welcoming newly admitted Members into the College. All will agree that the concept of "a family" is particularly appropriate to those of us practising our chosen branch of medicine. The family feeling is important for another reason. Our numbers in each of our countries are small in comparison with the Physicians or Surgeons and our voice therefore the less, but banded together in one College, to whose aims and ideals we all give wholehearted allegiance, our influence is very great. Our gathering for this commemoration gives emphasis to this unique structure of our College.

We are here to pay tribute to the wisdom of our founders, and to bask in the sunshine of what has been achieved in so short a time. We celebrate this by laying aside for a short time our common tasks and taking a brief holiday during which we meet in social events. Do not let us miss the opportunities these functions offer for renewing old friendships or, even more important, of making new ones. Do not let us confine ourselves to the usual conventions of social conversation but rather take the chance now provided for us of meeting those whom distance normally separates and learning of each

others' difficulties as well as successes. It is surely by a knowledge of each others' problems that the greatest degree of understanding and common action can be attained.

The strength of the College—and it is strong—has been built up by the enthusiasm of its members, and by their readiness to undertake tasks on its behalf often demanding a sacrifice of time or of leisure and even financial loss.

We desire to render homage to those who, often in addition to generous personal service, have given bounteously of their wealth, "our benefactors". It would not, I think, be reasonable to read a catalogue of names and it would be invidious to name some only, therefore let us salute all who have helped financially—our own Fellows and Members, many lay individuals, a large number of business and commercial enterprises and former patients. There is one gift which immediately gave the College a focal point of corporate life—this house—the gift of Blair Bell. We recall, with gratitude that it was opened by Her Majesty Queen Elizabeth, the Queen Mother, when she was Duchess of York, and a number of those here this morning were present on that occasion. It is a source of great encouragement to us that Her Majesty is demonstrating her continued interest by graciously consenting to attend our reception this evening.

We must, however, not only recall and rejoice in what has already been achieved, we should also look to the tasks that lie ahead. You all know that plans are in hand for the building of a new College. You are likely to hear much of this during the next few days. I want to make it clear that I personally do not regard this as an end in itself but as a means towards giving greater service not only here in the United Kingdom, but also to men and women from overseas. Of the new College itself I only want to say two things today. It will provide amongst other things accommodation for a really good museum as a teaching instrument and for staff to conduct our enlarging activities.

We should be constantly watchful to ensure that our standards of training and examination are maintained at a very high level. We should seek to mould these in such a way that all will recognize that the M.R.C.O.G. is the only necessary "hall mark" that an individual is fully trained and experienced for all the situations which an obstetrician and gynaecologist may be called upon to meet. We must, of course, keep ourselves in the forefront of knowledge and progress, but there are other things as well.

There are territories in the Commonwealth in which the medical services are still in the stage of development, and where they are establishing their own medical schools. To fulfil our primary object of advancing the science and art of obstetrics and gynaecology and to do this throughout the Commonwealth we must both progress ourselves and be prepared, if invited, to help them to progress and to achieve our standards.

The boundaries of science, including medical science, are not sharply defined like those of geography. It is one of the finest traditions of the practice of medicine that any advance in knowledge shall be made available to all. We are, therefore, particularly happy to have with us such a strong group of those who practise our branch of medicine in the United States of America, the great nation whose researches and clinical experience are readily available to us without any language difficulty.

We welcome them warmly and look forward to considering with them, later in the week, whether there is any means of helping each other to achieve the common aim of improving the standard of practice of our art.

These, then, are some of the aims to which I hope the College will devote itself in the future, but other and perhaps more immediate objectives may reveal themselves. Let us therefore solemnize this Jubilee by renewing in our hearts the obligation we undertook when we joined the College. If we thus dedicate ourselves to the service of the College and wholeheartedly undertake whatever tasks we may be called upon to perform, future generations will be justified in saying that we, too, played our part.

THE COLLEGE: ITS PAST, PRESENT AND FUTURE

THE WILLIAM MEREDITH FLETCHER SHAW MEMORIAL LECTURE*

Delivered on the occasion of the Silver Jubilee of the Royal College of Obstetricians and Gynaecologists in the College House

BY

SIR WILLIAM FLETCHER SHAW, M.D., F.R.C.O.G.

TWENTY-FIVE YEARS AGO the question was often asked "why found a third College?" The question itself inferred that, to the questioner at least, the welfare of obstetrics and gynaecology was safe in the hands of the ancient Royal Colleges. Nothing could have been farther from the truth.

Since Smellie rescued obstetrics from the hands of ignorant midwives, obstetricians had constantly endeavoured to stimulate the interest of the Royal Colleges in this branch of medicine, but with little success. True, a few obstetricians, at the end of the eighteenth century, were made Licentiates of the Royal College of Physicians, but only towards the end of the nineteenth century were they admitted to the Fellowship of the College. Meanwhile the Royal College of Surgeons refused to admit them to its council or board of examiners. What was infinitely worse, both colleges refused to include obstetrics in their qualifying examinations. Through their preponderance on the General Medical Council, they killed all attempts to make some training in obstetrics compulsory, until two years after the passing of the second Medical Act which required all candidates for the *Medical Register* to be trained and examined in medicine, surgery and midwifery.

After the foundation of our College it was discovered that a suggestion to found such a College had been made on several occasions, but always as a cry of despair when a reasonable request to improve training or examination in this subject was defeated. On no occasion does there seem to have been any attempt to implement the proposal.

The suggestion which was finally successful arose in a totally different way, due entirely to the fact that young physicians and surgeons had a definite portal through which they must pass while the young obstetricians and gynaecologist had none. Before the foundation of our College those who wished for hospital appointments in this branch of medicine proceeded along one of many, and often devious paths.

Clinical training was stressed in some teaching centres, where few received appointments on a teaching hospital staff who had not served a long apprenticeship in resident posts. In others, such resident clinical training was not available and here emphasis was placed upon higher diplomas, generally the F.R.C.S. and the M.R.C.P., although these examinations had little relationship to obstetrics and gynaecology. In others again, varying importance was accorded to one or the other of these methods, while in many instances the gynaecologist was merely a disappointed general surgeon without any specialized training.

This confusion was very evident to one who, in the early years of this century was undergoing a strenuous clinical apprenticeship of five years in resident hospital posts, the last three

* This lecture presents in a greatly condensed form, some part of the material which is set out at length in *Twenty-Five Years: The Story of the Royal College of Obstetricians and Gynaecologists 1929-1954*, by Sir William Fletcher Shaw, M.D., F.R.C.P., F.R.C.O.G., Hon.LL.D., President 1938-43 and First Hon. Secretary of the College. Published by J. and A. Churchill, Ltd., price 21*s*.

and a half years in one of the most exacting posts in the kingdom with an average of two calls each night year in year out. Physically and mentally it was impossible to return to the study of anatomy and physiology. Moreover, it seemed a waste of time and energy, after five years of hard clinical work, to study for diplomas with little or no bearing upon obstetrics and gynaecology, especially at a time when so many fascinating subjects in gynaecological pathology beckoned for elucidation.

Nevertheless, it was obvious that his colleagues, the young physicians and surgeons, had gained much from the quiet digestion of their clinical experience when preparing for a higher examination in their own subjects after a period of resident clinical work, as well as from the mental discipline occasioned by a course of enforced reading. If only there was a higher examination in obstetrics and gynaecology how much would be gained by candidates for this important branch of medicine.

The need for thorough clinical training was equally evident. In one or two instances, men who had obtained the F.R.C.S., with little clinical training, were preferred for senior surgical appointments. They proved dismal failures. In the whole region the three gynaecologists with the poorest clinical reputations were the only ones with this diploma—which they had obtained when they had ambitions to be general surgeons.

During my period of residence, two obstetric and gynaecological hospitals amalgamated. On the honorary staff of one each member had undergone this long period of resident training. On the other, the staff had had little or no resident training, though they were all able men and well known for their writings. In much the same way as a valet knows most about his master, a senior resident in a hospital has opportunities not available to others, to assess his chiefs. This experience confirmed the necessity of a thorough clinical training in hospital resident posts.

It was crystal clear at this early stage that obstetrics and gynaecology would never attain its rightful position until those who practised it entered by a portal controlled by the obstetricians and gynaecologists themselves, and, moreover, that this portal must consist equally of training and examination.

This was the first reason for the foundation of the College. Nothing short of a Royal College would accomplish this. But how to bring it about, how to convince men trained in such opposite schools that each was missing something, was a task beyond the capabilities of a young man, nor was the atmosphere of that period conducive to interest in the subject.

This College of the future, however, was seldom far from my thoughts and the vision of it had become all the clearer when, fifteen years later, two controversies arose which turned men's thoughts to the dangers of the present position and created an atmosphere sympathetic to the development of such a new foundation.

The early part of this century was the great period of surgical development, not in general surgery alone, but in every branch in which surgery could be used and in none more than in gynaecology. Men became obsessed with it as more and more conditions proved amenable to surgical intervention, while a corresponding impatience developed at the slowness and uncertainty of medical treatment. The ambition of the young was to practise surgery and they were inclined to think the day of general medicine to be finished.

In the early nineteen-twenties a campaign was launched to make gynaecology and surgical obstetrics a mere section of general surgery and to bring them under the care of the Royal College of Surgeons. Medical obstetrics was to remain under the Royal College of Physicians. This movement was basically a reaction against the restrictions imposed in many teaching hospitals on the development of surgical gynaecology. Obstetrics and gynaecology is in fact a combined section of medicine, and the new surgical gynaecology of this period was superimposed upon what had originally leaned more to general medicine.

Naturally enough a struggle in loyalties arose. For the younger men tended to give more and more time and thought to surgical development, no matter how well trained in and devoted to obstetrics they had previously been. For a time they were carried away by their surgical enthusiasm and did not pause to consider the

ultimate goal of this movement and what effect it would have upon obstetrics and, indeed, upon women in general. A few teaching schools did go so far as to separate the teaching of obstetrics from gynaecology, though all reverted to combined teaching on the next appointment.

What was even more disturbing, several men whose qualification was the F.R.C.S. and who had not held even a six months resident appointment in a maternity hospital, were appointed professors of obstetrics. This shook the general body of gynaecologists. They realized that, carried to its logical conclusion, the movement afoot would separate obstetrics from gynaecology and that, in all probability, the ablest men would be attracted to gynaecology, while obstetrics would be left to the second-rate.

It was clear too, that in the future women with gynaecological ailments would have to rely upon men trained in abdominal surgery and with a surgical outlook on the problems with which they were confronted, and scanty knowledge of obstetrics and medical gynaecology. As a result, many women in the plenitude of their powers would be debarred from the motherhood that more knowledge and patience might have procured.

So it was that the second main objective in the foundation of a College was to prevent the divorce of obstetrics from gynaecology.

During this same period—the years immediately following on the first world war—the laity for the first time expressed an interest in maternal mortality. Meetings were called to discuss this subject and to stimulate political action, and attempts were made to put the blame for a high mortality upon the medical profession whose results were compared unfavourably with those of the midwives. In doing this, the promoters failed to explain that when a midwife with a difficult case called a doctor to her aid any disaster was now recorded as a medical case.

Nevertheless, although much of this blame was undeserved, the teachers were well aware that the training of the medical student in obstetrics was inadequate. The only sure way to reduce maternal mortality was to improve the training of the future doctor and the first way to do this was to make compulsory a period of resident training in a maternity hospital. Only by this means could he see cases through the various stages of labour, and not only at the moment of birth. What was even more important he would learn to diagnose abnormalities in the antenatal period and recognize his own limitations in treating abnormal cases.

To desire more and better teaching was one thing, to obtain facilities for it from the various universities and teaching schools was quite another. The whole combined power of obstetric opinion would be needed for success.

The third reason for the College was clear. For such a College could bind together the teachers of obstetrics to demand, with authority and effect, adequate facilities for teaching and for examining.

Finally, a fourth, very obvious demand for a College could be added to these first three. One corporate body was vitally needed which could express the considered opinions of obstetricians and gynaecologists upon any subject connected with this branch of medicine. So necessary were these four major concepts and so interested now were the laity in obstetrical problems, that the foundation of the College at last became possible.

The proposal to found a College was in the first instance put before the Gynaecological Visiting Society, a small group of gynaecologists founded by Blair Bell of Liverpool. This society met twice annually in various centres and by the year 1924 it numbered amongst its members all but two or three of the Professors of Obstetrics and Gynaecology in the British Isles. This small body discussed the proposals, unanimously accepted them, formulated plans to found the College, and drafted the articles to govern it. After two years of preparatory work, they retired as a corporate body, after formally inviting the obstetricians and gynaecologists on teaching hospitals and a few on non-teaching hospitals to become Foundation Fellows or Members of the new College and to attend a meeting to discuss the proposals.

These Foundation Fellows and Members were already members of the honorary staff of their respective hospitals. An additional diploma meant little or nothing to them. They joined with enthusiasm and worked to make the College a success because they recognized the importance

of these four principles, if obstetrics and gynaecology was ever to occupy its rightful position in British medicine. They joined as they would a crusade to work for an ideal and any success the College has attained is because so many were prepared to give so much without hope of reward.

To recapitulate briefly. The four main objects for which the College was founded were:

(1) To form a portal through which all must pass who wished to be consultants in this branch of medicine, this portal to consist of equal parts of training and examination.
(2) To prevent the divorce of obstetrics from gynaecology.
(3) To bind the teachers of obstetrics and gynaecology together so that they could demand adequate facilities for the teaching and examining of students.
(4) To act as the representative body of all obstetricians and gynaecologists.

Many other aims and ambitions crystallized out during the foundation and development of the College, but these were the four fundamental reasons for its foundation. The extent to which the College can be considered a success depends upon the extent to which these four objectives have been achieved.

The Present

1. *The Portal*

The suggestion that the portal should consist equally of training and examination was something new. Higher medical diplomas at that time were granted solely on the results of examinations, without any special regulations for training. The comparatively young teachers who composed the Gynaecological Visiting Society had for the most part considerable clinical training, and they understandably accepted the principle of a combined portal. We anticipated opposition, however, when the plans were made public and older men brought into the councils.

Strange to say, the first reaction of a small group of senior London teachers, the first to be consulted, was exactly opposite to what was expected. Training was accepted wholeheartedly, but examination as vigorously opposed. The cause of this unexpected reaction is difficult to assess. The only reason given was that young men were already over-examined and this burden should not be made heavier. On this most people were agreed.

The curse of this age is assessment by examination alone, which unduly favours a certain type of mind, to the exclusion of other and equally desirable characteristics. Unfortunately, no one has devised a satisfactory test which eliminates examinations and the majority of us were agreed that the preparation for one higher examination would be beneficial. Where we differed from the senior men of the time, was, I think, that they could not visualize a new examination, conducted by a new college, *replacing* the examinations of the old Colleges of which they were Fellows. In their hearts of hearts they were convinced that the diploma of the new College must always be additional to that of the older ones. This misconception caused much delay in building the portal as it was first visualized.

However, little by little, additions were made both to training and examination: each step was tested by trial and error before being accepted, until at last the support of all was won, and the portal emerged as first planned.

The first necessity was to define training and soon it became clear that, if all schools were to share in it, a lower standard must be accepted than many thought necessary. In 1929, few resident appointments outside teaching hospitals could be accepted for training. These were so few, in proportion to the number of students qualifying each year, that at first the College had to be content with six months as either house-physician in general medicine or house-surgeon in general surgery, with six months resident appointments in both obstetrics and gynaecology or one year in a combined post. A total of only eighteen months.

From the first, the College would accept for training purposes only those hospitals which were visited by the College and conformed to its requirements in the number of beds, status of consultant staff, limitation of the resident's work to obstetrics and gynaecology, the provision of laboratory facilities and periodicals, and so on. This had a great effect in stimulating and guiding the upgrading of the old workhouse

hospitals under the Local Authorities and later under the Regional Boards. As time went on, more and more of these hospitals could be accepted for training. By 1946 the College was in a position to insist upon each candidate having held resident appointments of six months each as house-physician in general medicine *and* as house-surgeon in general surgery and one year each in obstetrics and gynaecology, that is a minimum of three years of resident appointments in hospitals recognized by the College. So, although in the first place the concept of better training was welcomed by all, the number of fitting appointments was for a long time a serious retarding factor.

Examination was a totally different matter, and was strongly opposed in those early days by some of the senior members of the Council. In the first instance, the body of the College was formed of Foundation Fellows and Members, men and women already holding staff appointments and who were invited to join the College.

After these came a group of Registrars and others, already well-trained, but awaiting staff appointments. All were known to one or more members of the council of the new College. More for the sake of form than with the intention of excluding any of them, it was arranged that each should be interviewed by some senior member of the examination committee. This began as a very informal proceeding and was held in the candidate's own centre, often by his own seniors, at any convenient time. Soon, however, the candidates sought entrance at an earlier stage and from farther afield. Many were now unknown to any member of the Council and it was gradually recognized that a filter must be constructed and, later again, that this must be strengthened and tightened.

With some doubt, the seniors accepted the suggestion that each candidate must submit the records of a specified number of both obstetrical and gynaecological cases which had been under his care. He must also submit two short commentaries, one obstetrical the other gynaecological, on one or a group of these cases, laying special emphasis upon the literature of the subject. Soon doubts were changed to enthusiastic support when it was found how greatly the general level of note-taking was raised in the wards concerned.

Moreover, it quickly emerged that in the interviews with candidates the discussion of a case which had been under the care of the candidate, gave a much clearer insight into his attitude of mind and showed whether he had treated the case with intelligence or merely by rule of thumb. The irregular interviews gradually developed into an oral examination held on specified dates in the College House by an elected group of examiners.

Still later it was agreed that a clinical test must be added. After one attempt to hold this in the College House, it was transferred to the various London hospitals. The pair of examiners were always one from London and one extra-metropolitan.

Finally, six years after the College foundation, all agreed, even the seniors who had most strongly opposed examination, that a paper must be added to the oral and clinical parts. This, at first, consisted of two papers, each of two hours, but it was soon increased to two papers each of three hours. These were to include one question on a general medical and one on a general surgical subject closely related to obstetrics and gynaecology.

This last decision is interesting as indicative of the quiet struggle which has continued since the first quarter of this century, when the minds of many of the younger men were unduly biased into thinking of obstetrics and gynaecology as a mere branch of general surgery. Any criticism of the training and examination required by the College in the twenty-five years of its history has generally come from those who have wished more emphasis to be placed upon surgery.

In resisting too much emphasis upon surgery, and in laying down regulations whereby the candidate is trained as thoroughly in general medicine as in general surgery, the council has always had in mind the primary purposes of the College's foundation. The prevention of cleavage between obstetrics and gynaecology was the second of these and assurance that those giving advice to the women of this country do realize that medical and local treatment, though often more tedious and less spectacular, may give results which from the obstetrical stand-point

are of more lasting benefit. Moreover, as the objective is to train candidates as well in obstetrics as in gynaecology, as much emphasis must be placed upon general medicine as upon general surgery.

So it came about that, six years after the foundation of the College, was implemented the dream of nearly thirty years, a dream which in reality was the germ of the College foundation. At last it could be said that all candidates had a sound training, and examination in both obstetrics and gynaecology.

In the twenty-five years following the foundation of the College its membership has steadily grown in value and is now generally recognized as the hallmark of an obstetrician and gynaecologist, not only in this country, but in our Dominions, and I doubt if any candidates receive appointments as consultant gynaecologists in the National Health Service unless they hold this diploma.

2. *Obstetrics and Gynaecology Combined*

The second main objective of the founders, to prevent the separation of obstetrics and gynaecology, can also be claimed to be won. There are still a few special hospitals devoted to one or the other, but no additional ones have been founded. Usually, moreover, the members of the consulting staff of one type are also on the staff of a hospital of the other type. In teaching and examining, obstetrics and gynaecology are treated as one subject in all medical schools in the British Isles and, with three exceptions, in the whole of the British Commonwealth of Nations.

3. *Teaching*

Training and examination of medical students left much to be desired in 1929. The most convincing proof of the effect of the College in this direction is the steady improvement recorded in the reports of the Inspectors appointed by the General Medical Council in 1921, 1932, and 1946.

In 1921, eight years before the College came into being, only three examinations demanded any. period of resident training in a maternity hospital and only twelve out of twenty-three had any form of clinical examination. As Sir William Smyly points out in his report, the theoretical knowledge of midwifery is comparatively limited while its practice is difficult and requires much time and attention. If students were not to be examined on the practical side they could not be expected to give much time and attention to it.

In 1932, three years after the foundation of the College, Fairbairn found that all but one examination had a clinical section, and as a report of "not satisfactory" now entailed re-examination even this tough rebel instituted this test six months later. What was even more important, the General Medical Council decided about this time to review its requirements for training and examination and asked the College for advice. Under the chairmanship of Fairbairn a committee was set up whose report, after thorough discussion and modification by the Council, was generally accepted by all teachers. These recommendations were in a large measure accepted by the G.M.C. in 1936 to come into force in 1938. Unfortunately, the outbreak of war in 1939 made it difficult for some examinations to implement the whole of the recommendations and easy for some others to find a good excuse not to do so.

In my report of 1946 there is some improvement over 1932, but not so much as might have been expected and, indeed, would have been insisted upon had not war disorganized many centres.

The line of demarcation between two types of examination becomes clearer in each report. In the great majority of universities the Professor is responsible for the organization of the examination, as he is for the teaching. In the small number of universities in which this does not hold and in the majority of non-university examinations, the organization of the examination is in other hands. Each of these reports clearly indicates that most of the examinations with deficiences in training or in examination fall into the latter category. Those in which the teachers are responsible for the examination give rise to few complaints.

This steady improvement is due in a large measure to the increased co-operation of all teachers through the College. Agreement was reached, after thorough discussion, upon what was desired and what was practical. Then,

with the whole weight of the College behind him, each individual teacher, or group of teachers, was able to persuade his governing body to accept improvements.

Although my own university was one of, if not the first, to make resident training compulsory and to institute a clinical examination, it was only now, with the College supporting us, that the late Professor Daniel Dougal and I were able to co-ordinate obstetrical, gynaecological and paediatric clinical training, to raise the marks in the final examination to the level of general medicine and surgery, to make a pass in clinical obstetrics and gynaecology essential, and to make our colleagues realize that a candidate failed in obstetrics and gynaecology was not automatically raised if he passed in medicine and surgery. Other Professors elsewhere had the same experience.

The influence of the College in the first fifteen years of its life had greatly improved the training and examination in obstetrics and gynaecology in all the examinations controlled by the teachers. Its influence in examinations outside this category could only be indirect and many still left much to be desired. For what has happened in the next decade, we must await the report of the inspection now being made.

4. *The College representative of all Obstetricians and Gynaecologists*

Our first President, Blair Bell, had deliberately to seek opportunities for the College to display its special knowledge. In December, 1929, he obtained an interview with the Minister of Health and was asked to submit reports upon "anaesthesia in labour" and upon "maternal mortality". A request was also made for a draft "maternity scheme". Whether these suggestions emanated from Blair Bell or from the Minister is of little moment. The Minister evidently welcomed the opportunity to obtain advice from experts on subjects forced into the political arena by bodies with little or no expert knowledge. Indeed, he offered to defer a Bill to improve the maternity services which he was shortly to bring before Parliament.

Only when these subjects were debated in Council did we fully realize how particularly fitted this body was to express opinions representative of the whole of the British Isles. What was advocated by London members was sometimes criticized by provincial and condemned by Scottish or Irish representatives and *vice versa*. Frank and friendly discussion in Council alone could provide a compromise acceptable to the whole of the British Isles. Sometimes this took time, and occasionally agreement was not possible. But at least members did learn the views of other parts of these Islands and this was preferable to a publicly expressed opinion from one part of the country which might encounter public criticism or indeed a flat negation in others.

Three years later, when Fairbairn was President there was no longer any necessity to solicit opportunities to give advice. Requests were continually made by outside bodies for an expression of opinion or for help. A little later still, in Ewen Maclean's presidency, these became so numerous that care had to be taken not to allow the College name to be used as supporting objects which had not been submitted to the careful consideration of the Council. This, in turn, often necessitated investigation by special sub-committees. In our own time we may fairly say that all subjects appertaining to obstetrics and gynaecology are automatically referred to the College for its opinion and advice and often also in the hope of obtaining its support.

The Future

Now what can I say of the future?

No one in his senses would dream of foretelling what may happen to the College in the next quarter of a century. But as one so closely associated with its foundation, I may perhaps be forgiven if I indicate one or two directions in which development is required, and also one or two dangers ahead.

The College has attained its main objectives more thoroughly and in a shorter time than any of its founders could have thought possible. There lies a danger. A quarter of a century ago, a small minority were satisfied with their lot. Complacent in their contentment, they could not understand why the majority were making such a fuss and disturbing the even tenor of their

ways. Fortunately, however, the great majority, the country over, were far from satisfied with the position accorded to obstetrics and gynaecology, and were prepared to fight for their ideals.

On these foundations the College built and grew and gained its first objectives. But if the College is to remain in the forefront of medical advance, there is still no room for complacency. This is not time for sitting back. Let us not forget that a College, like every living organism, either advances or retreats. It cannot be static. It is as vital today as it was twenty-five years ago for each Fellow and Member to take an active interest in the welfare of this corporate body.

It is to emphasize this personal relationship that each new Fellow and Member is personally admitted to the College by the President. In order that Members shall have proper opportunity to make their opinions felt and to play their part in the moulding of the College, one-third of the Council seats are allotted to them. Every encouragement is given to youth—and well they have responded. You yourself, Mr. President, as a Member, sponsored this suggestion at the first public meeting in 1927, and several, who are now amongst its most trusted leaders, commenced their active association with the College as representatives of the Members.

One development which is a sure sign of healthy growth is much in mind at present. The College House was so much too large for the College activities twenty-two years ago that many hesitated to accept the responsibility incumbent upon this generous gift. Today it is outgrown and much too small and a new home must be obtained. This is a pressing necessity and I have no doubt under the active leadership of you, Mr. President, and the Honorary Treasurer, will soon be attained. This is a material development, however. Today I desire rather to direct your thoughts to ideals.

The College was founded firstly to provide a portal, composed equally of training and examination, through which must pass all who wish to practise as consultants in this branch of medicine. In so far as all candidates for consultant appointments must now pass through this portal, the College has been successful.

Can we, however, consider the success complete so long as certain hospitals require an additional diploma? That a few hospitals retain this requirement must be due to the fact that either these additional diplomas demonstrate some knowledge or ability or training additional to what is guaranteed by the M.R.C.O.G., or that they are archaic survivals in hospital regulations which we are accepting with complacency.

If the additional diploma demonstrates valuable additional training or knowledge, it means that the Council has failed to include in the training or examination for the M.R.C.O.G. subjects which are essential to the knowledge of a gynaecologist. Or that the examiners have failed in their duty to maintain a sufficiently high standard.

If, on the other hand, these regulations are accepted merely because they were in being before the College was founded, then this is complacency which is retarding the advance of obstetrics and gynaecology. When he has passed through our portal, the young Member is ready to take a higher resident appointment with increased clinical experience and responsibilities. To forgo this, while preparing for diplomas with little bearing on his life's work, is to rob him of the two most important years of his career.

I must emphasize that I do not say that the training and examination for this additional diploma may not contain something which the M.R.C.O.G. has missed. What I do most emphatically state is that if any of our Fellows really believe this, then it is their duty to put their views before the Council and for the Council to give them full consideration. The Council can mould the training and examination as it thinks fit. The Council elects the examiners and can drop any who fail to maintain the standard which it desires. With such complete power in its hands, I do not feel that the Council has established our own portal satisfactorily so long as there remain those who, whether from active belief, or from complacency, require candidates for certain appointments to hold other diplomas.

The second main objective, to prevent the separation of obstetrics from gynaecology, has largely been attained. But here again there is no room for complacency. Although in the whole of the British Commonwealth of Nations the integration of obstetrics and gynaecology is

assured, in this country one of the partnership, obstetrics, has suffered cruelly through the National Health Service Act. Instead of the whole of the National Maternity Service being controlled by one central authority and locally administered from centres with control over it and its ancillary services, the responsibility has been divided between four bodies, Local Authorities, Executive Councils, Regional Boards and Boards of Governors.

The unification of this service, which you, Mr. President, have much at heart, is one of the most pressing needs of obstetrics in this country.

In the whole field of teaching in the whole of the British Commonwealth of Nations, I think I am right in saying that, except in three universities, obstetrics and gynaecology are now taught as one subject under one Professor. Is it too much to hope that in the future these three universities will reunite them, as did the universities in this country?

Training, teaching and examination of students in obstetrics and gynaecology have made great strides since the foundation of the College. It must be remembered, however, that there are still a number of examinations of which the examiners of obstetrics and gynaecology have no control. The reports of the Inspectors of the qualifying examinations to the General Medical Council in 1921, 1932, 1946 show that the majority of examinations which accept lower standards of training or provide less satisfactory examinations, come into this group.

It may be that the present decennial inspection will show an improvement but so long as the teachers of obstetrics and gynaecology are excluded from the organization of some few examinations it is probable that they will lag behind the others.

However, so long as these diplomas are accepted by the General Medical Council any improvements must await the initiative of those who now control them.

Dominions

During the formative years of the College, friends from the Dominions who visited us were told of our ambitions and I think it came as a surprise to most of us to find that in all parts of the British Empire obstetrics and gynaecology received as little consideration as in this country.

In Canada, the physicians and surgeons had recently founded a combined Royal College of Physicians and Surgeons, but they had refused the request of the leading gynaecologists to make it a triple college and admit the third large branch. In Australia, the physicians and surgeons had founded separate Royal Colleges, the one housed in Sydney, the other in Melbourne. Neither of these took any interest in obstetrics and gynaecology. In New Zealand, most of the gynaecological practice was in the hands of the general surgeon, while obstetrics was largely controlled by the general practitioners.

From the first, our Dominion visitors urged a widening of our proposed constitution to include the Dominions, and when the College was founded most of the recognized consultants in obstetrics and gynaecology in the Dominions became Foundation Fellows or Members.

Like ourselves, the obstetricians and gynaecologists in all these countries were in a minority. But combined through the College we formed a strong body, speaking for the whole of the British Empire and able to exert an influence impossible for any of the individual and scattered components.

During the twenty-five years of its history, the College has gone from strength to strength in the Dominions. In Australia, Canada, and New Zealand the original nominated Reference Committees have become elected Regional Councils qualified to express the opinion of the whole body of obstetricians and gynaecologists upon their own subject in their own country. South Africa was somewhat slower in development, but here too, it is hoped, in the near future, there will also be a Regional Council.

In India, Pakistan and Ceylon work has been much curtailed by changes after the war, but the Council has development in these Dominions much at heart.

Meantime, the Royal Colleges in Australia and Canada have developed an interest in gynaecology and both now give a Surgical Fellowship in it. Their action is an attempt to turn back the hands of the clock.

In this quarter of a century, the Dominions

have gained much from the College and the College equally has gained much from them. In co-operation has been our strength and in continued co-operation will remain our strength.

As the movement has grown in each Dominion it is only natural that more autonomy is desired. This the College is only too willing to give. Close co-operation and exchange of ideas, however are most necessary, otherwise each country may follow its own course without reference to the others and hard-won unity may resolve into small conflicting units.

Aviation has done one good thing. It has made co-operation and consultation possible in a way unbelievable twenty-five years ago. A letter to New Zealand now takes five days instead of six weeks. More important, representatives of the Dominions can now be elected members of the Council and few years now pass without an accredited member from each being present at least at one meeting.

To bind us all yet closer together Sir Arthur Sims endowed the Sims-Black Professorship in obstetrics and gynaecology three years ago, whereby, every two years, the College elects a Professor to visit one or more of the countries of the British Commonwealth of Nations.

Mr. Gibberd was the first Professor and he visited South Africa, Canada, New Zealand and Australia. This is too strenuous a tour to be undertaken in the short time available, and the journeying of the second Professor the Council has elected, Professor Bruce Mayes of Sydney, has been limited to this country.

Australia is the first Dominion to acquire a College House, whose opening you, Mr. President, are to attend next month. This will be not only a centre for obstetrics and gynaecology in Australia, but an ocular demonstration of our equality with the other two large branches.

Younger Fellows and Members, both in this country and in the Dominions, not immediately appreciating the increased strength and influence exerted in each of these countries through this co-operation, may sometimes feel impatient of so much consultation and discussion before a move forward can be made. If there are any who do so feel, I would ask them carefully to study the position of obstetrics and gynaecology in his own country before this co-operation was achieved, and to remember that its influence as a small separate unit would be correspondingly diminished.

Mr. President, the College was founded with definite objectives. I hope I have shown how far, how unbelievably far, these objectives have been won in this short period of twenty-five years.

There is still much to be done. This is no time for complacency.

We who founded the College have laid down our task. The future is in the hands of younger generations. We stand aside and contemplate that future in the quiet assurance that in their hands the steady development of the College is assured.

THE MAKING OF AN OBSTETRICIAN

THE SILVER JUBILEE WILLIAM BLAIR-BELL MEMORIAL LECTURE, 1954

BY

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Sydney, Australia

Sims-Black Travelling Professor

A PHILOSOPHER in Australia once divided the human race, in the matter of knowledge, into 4 classes:

(1) Those who know all about everything.
(2) Those who know nothing about anything.
(3) Those who know many things about something.
(4) Those who know something about many things.

Of Class 1—"those who know all about everything" he declares he has never known a specimen who lived to be more than 25 years. They all die young!

The 25 years' yardstick happily excludes all of us here today and enables me to hurry past that unattractive group.

Class 2—"those who know nothing about anything" is, I understand, a very large group; some heartless philosophers would go so far as to include everybody in this class.

Class 3—"those who know many things about something". With pardonable conceit, Sir, do you think he means us?—the Specialist. "It is generally understood", he states, "that they are the salt of the earth, while some people go so far as to think that in the modern world there is no room for anybody else." But wait.

Class 4 is a large and worthy family—"those who know something about many things"—and applying the classification to the medical profession I suppose that we could call Class 4 the General Practitioner. He *has* to know something about many things.

It is a signal honour that you have done me in asking me to deliver today the Memorial Lecture to a great man, the late William Blair-Bell. I have chosen, with the President's approval, a subject which I felt that Blair-Bell as a Founder would have regarded as appropriate to the Celebration of the Silver Jubilee of his College.

I am encouraged to believe this because the only memorandum issued by the College on the Training of Medical Students is one issued very early in the College's life (1932) and it bears the signature, W. Blair-Bell, President.

And so, Sir, I return to the classification of mankind and its application to the practice of Medicine. Perhaps you will agree that broadly speaking, our profession is still divided into two classes:

(1) Those who know many things about something, and
(2) Those who know something about many things.

This, our College, is undoubtedly the greatest single factor today in filling the ranks of the Specialist Obstetricians, but a great deal of Medicine, and particularly Obstetrics, is still done—at least in my country—by the General Practitioner, and probably will be done for a very long time because of our geographic factor.

Now I am not concerned this morning with the details of a curriculum. No, Sir, on this College Birthday I would prefer, with your permission, to regard critically the human machinery for producing the obstetrician, and dwell for a time on the non-technical, the humanistic side, the obstetrician as an artist as much as a scientist; the patient, her psyche as much as her soma, taking a glance now and then over our shoulder at those who have passed into the silence, but have left us a rich legacy of example.

What is an Obstetrician, and how do you make one?

An obstetrician is defined as "one skilled in obstetrics". His origin was from the latin *obstare* —"to stand before", and his function is "to obstetricate". This ugly description satisfies the author of a dictionary, but there is somebody infinitely more important to be satisfied, and that is the pregnant woman. And so I asked a number of mothers "What is an obstetrician"? The answers could be summed up in a few regularly recurring sentences:

An obstetrician is one:

1. "Who, to a sound academic training, adds 'the human touch.'"
2. "Who determines, and often so easily, the whole attitude of a woman towards childbirth."
3. "Who remembers that to a woman pregnancy and childbirth are experiences which rank with the greatest of her life."
4. "Obstetrics is a real human story, and it takes a real obstetrician to write it."

You see, after becoming skilled in breech delivery or a persistent occipito-posterior we have, according to mothers, done only half the job. Their horizon is not one of test tubes and instruments, but of pink and blue ribbons. We have to try and keep it so.

There is a very fine man I would like to have brought along with me this morning but I couldn't, because he died; he died 200 years ago. His name was William Smellie. In this country, the home of this greatest obstetrician of all time, I understand that 200 years ago the doctor, as an obstetrician, was only in his swaddling clothes. The midwife, described by the historian of that day as being often unskilled and of course uneducated, apparently called in a doctor only in cases of undue delay, difficulty or haemorrhage.

To enter as a consultant at what was often a grim stage (in one case of a breech the midwife had avulsed the trunk from the head still in utero) is a position that today would exercise any young "M.R.C.O.G." even in the sanctuary of a modern hospital. But young Smellie delivered the loose head with a crotchet and finger traction, "extracted the placenta" and then "went and recovered the midwife by giving her some volatile spirits and water"!

It is interesting to recall that at this stage, as far as we know, he had no University degree or licence from the only existing body of authority in those days—the Royal College of Physicians.

It seems that he had acquired his experience by apprenticeship.

Smellie satisfied the dictionary; he was certainly "skilled in obstetrics" but he was much more—he satisfied every requirement that the mothers lay down for an obstetrician.

He was skilled. He was human and understanding. He took an interest in his patient, not just in her pelvis.

He taught others. He told what he had *done*, even when it meant admitting a mistake, not what you *should do*.

Moreover, he was an educated man, but I shall save my remarks on education until a later stage.

It is interesting to speculate today on Smellie's admission to our College. I doubt, Mr. President, that he would qualify by his hospital training; but he was well-trained and an eminently suitable candidate for admission. It is pleasing to see that *our* College—and you will forgive the possessiveness of an Australian cousin who calls it *our* College—demands not merely technical skill but other qualities of character and mind that are essential to one who is to be judged a fit and proper person to care for the body and the mind of a pregnant woman and her unborn. No other branch of Medicine carries such a responsibility—two lives; two generations.

That is an obstetrician. How shall we make one?

The making of an obstetrician starts at school. You will say, Mr. President, that I am making a very homely subject of it to sow the seed of the obstetrician in the schoolroom. Indeed, Sir, predestination of a career according to some goes back farther than schooldays. There have been more than isolated infants who, as mother's love and father's joy have been *born* doctors—"cut out" for Medicine since birth, that infant prodigy with deep thoughts on birth, death and the intermediary stages or the infant surgeon who zealously dissected his toys.

I have read with interest and appreciation

several reports including the recent B.M.A. report on "The Training of a Doctor". I have applied the opinions of these worthy conscientious experts on Education (and they include several of our own College) to our problem in Sydney University, and as my remarks may be critical I shall apply them mostly to our own local schools. They may possibly apply here.

The B.M.A. report, "The Training of a Doctor", seems to me to be the latest British review of this subject and therefore would have benefited by earlier reports and consequent experiments. I was interested to read that "the intending medical student receives little, if any, instruction in general cultural subjects after the age of 15-16 years, but devotes practically his whole time to the study of physics, chemistry and biology with a view to passing an exam which will exempt him from the first M.B. or which will secure for him a University Scholarship in those subjects".

What a pity; what an extraordinary vocational bias in school education. When you think that a boy (or girl) has the rest of his life to study and develop his bias, what a waste of the few school years which for most represent the only opportunity in a lifetime of sowing a cultural seed.

In Sydney University in 1944 a retrograde step was taken which brought things to much the same state I have just described for another country, and the resultant deterioration in the educational standard has been so marked that 9 years later (in 1953) as a Professorial Board we eventually rebelled and after a great deal of discussion recommended the adoption by Senate of a standard of matriculation which will again place an equal emphasis on the cultural, as on the scientific subjects.

In 1944 English was made the only compulsory pass. We now seek the restoration of a foreign language and, hopefully, Latin as a mandatory subject.

I have examined a few thousand students since the low 1944 standard was introduced. Naturally with English the only obligatory subject the prospective medical student in his last two years at school took English because he had to, and studied physics, chemistry and biology.

I agree that those students can still become skilled obstetricians and satisfy the dictionary, but one's respect for an educated profession is hard to maintain when a final year student in his paper spells ante-natal "ant*i*-", and a resident medical officer presents me with a précis of the case for a clinical lecture with the same error. Such are only medical tradesmen, and on the same educational level as the woman in the Out-Patient Department who asked me, "Doctor, why do they call it the Anti-natal Clinic—I thought it was meant to help women to have babies not to stop them."

That, Sir, is why, for patients and students since 1944, I insist on it being called "*Pre-natal Care*" till the day when we are re-educated.

An analysis of School Leaving Certificate results in N.S.W. over the past 15 years is not reassuring if you are keen to see a liberal education.

The results of 1953's examination confirm a change in the subjects favoured by students. This change has occupied our attention closely since the University, in 1944, chose to abandon a well-tried academic route by discarding its foreign language requirements and lowering its Matriculation standard.

In 1939, 58 per cent took the Latin paper. In 1953 it fell to 12·7 per cent. Latin is moribund. Greek is really dead. In 1939 1 per cent of students took the paper. In 1953 less than ¼ per cent took the paper.

The unfortunate further result is, of course fewer teachers, so that the position must deteriorate further.

The drift from the classics is accompanied also by a drift from modern languages. In 1939 95 per cent of students took French. In 1953 43 per cent of students took French.

History was also given the cold shoulder. In 1939 82 per cent of students studied Modern History. In 1953 it had fallen to 62 per cent.

Well, you will say, what's all the fuss about? What have Latin, French and Modern History to do with making an obstetrician and gynaecologist?

I would answer, "a great deal", if the people who will fill these College halls in 50 years are to be full and complete doctors.

There is no doubt that the majority of graduates today take a utilitarian view of education. How can Latin help me to earn a living? He who asks that question really doesn't want an answer because he's so busy earning a living that I doubt if he has time to live.

Still it is a fact that the humanistic subject *does* help the scientific. R. W. Johnstone, in his delightfully written life of William Smellie, expressed the feelings of many of us when he said that Smellie's local grammar school at Lanark gave him a good working knowledge of Latin and probably some knowledge of French. He continues, "a good grounding in elementary mathematics was also a feature of a Scottish education in those days, and to that and his training in Latin we may surely trace that power of orderly and logical thinking which was to raise him to eminence in his profession".

At that age and stage the student should know "something about many things".

The University. And so we move to the first great academic adventure. With a family fanfare and a heart full of anticipation he places himself in our hands. It is a mighty responsibility for us.

Now I am not going to inflict on you the details of the ideal medical curriculum. Those have been worked out, talked out and published in a now imposing row of reports which you have read. They are of considerable value and we accept them without, of course, the blind credulity that marks the attitude of some to a document that bears the imposing imprimatur of the expert body.

Indeed, I am sure that these experts and scientists would wish us to display towards their reports that critical faculty that they themselves are so keen that we should develop in our students.

And so, Sir, if in my comments I should appear to be a disbeliever in the infallibility of the educational expert, it is because of my disappointment, because I am co...strained to doubt the verdict of a body that is mainly academic on the teaching of a practical clinical subject. Please forgive me, but it is so disappointing to see the movement in these islands towards full time clinical chairs. We have tried them : in my experience they are not the answer.

In discussing the problem of obstetrics I shall apply my remarks to the local conditions in Sydney and Australia, because I realize that the obstetric "set-up" in the United Kingdom is somewhat different to that in our country.

As I see it, our practice of obstetrics differs from yours because of two Australian factors:

1. Geographical position.
2. Virtual absence of domiciliary obstetrics.

1. *The Geographical Position*

I want to make it quite clear that it is not a question of isolation. There is probably no country in the world where conditions for aircraft are so uniformly good from one year's end to the other, and it very rarely happens that an obstetric case could not be flown within a few hours to the sanctuary of a large city hospital. The Flying Doctor Service is a great help.

Most of the obstetrics in Australia is done by the general practitioner. We have, of course, mostly in the larger cities, a strong specialist core. We are proud to have upwards of 200 Fellows and Members of the Royal College of Obstetricians and Gynaecologists in Australia. This represents *16* per cent or one-sixth of the total College strength.

I repeat, most of the obstetrics is done by the general practitioner. Obstetric nurses do deliver women, but they do so almost completely in hospitals, under the supervision of a medical staff.

Now, as a College man I look forward to the ideal maternity service where pre-natal care and delivery are confined to those who have been specially trained—by those who know many things about something obstetric.

I don't know how far off that desideratum may be—I fear a very long way off in Australia. But I am not distressed about this because our general practitioner is a man of no inferior ability, while specialist opinion and help can be, and is, readily sought and obtained.

This consultant accessibility is improving annually as more members of the College settle in the larger country towns, making the doctor less dependent on the capital cities.

That is the background, then, for our teaching. Our students should be trained to a high standard of diagnosis, ability to deal with the

more common emergencies and resource to cope with the unusual.

What do you think of this for a piece of resource? A doctor wrote to me from one of the islands in the North of Australia telling me how his work involved confining native women usually in their huts, sometimes under a tree. It was a one-doctor island. He overcame the absence of an anaesthetist for manual removal of the placenta by developing his skill in umbilical cord injection. On one occasion recently he found himself without his bottle of saline. He called a native boy, told him to "shin" up the tree and bring down a few coconuts. These he quickly cracked open and injected the cord with the clean, uncontaminated milk of the coconut. The placenta came away and the mother made a splendid recovery.

Of course in Australia we can provide the most primitive obstetrics. A blood-stained sea-shell was sent to me recently by an ex-student of mine, Dr. Billington, who was a member of the Arnhem Land Expedition. From a lonely, sandy beach, away in the wilds of North-West Australia, he described an aboriginal birth. As the black woman felt labour progress she moved to the beach, expelled the baby on the warm sand, and, picking up the shell, quietly cut the cord. To quote Dr. Billington's graphic description—"One swift stroke with a sharp edge of the shell accomplished the deed."

You fortunate people live in such a compact and very civilized country that I am constrained to feel that at times it may not be easy to appreciate our geography.

Here is a map I have prepared showing the relationship of our country to the capital cities. If we superimpose U.K. and Europe on it you will see that Moscow is closer to London than Perth is to Sydney, that when, a few months ago I flew on a 2-day Postgraduate Course to Launceston (Tasmania) my journey, if taken from London, would have taken me over several countries.

2. *Domiciliary Obstetrics*

Domiciliary obstetrics with us is virtually absent. From the figures for N.S.W. I present to you, it can be seen how completely the picture has changed in the past twenty years. In both city and country 99·2 per cent of confinements take place in hospital.

I realize from my travels in the United Kingdom that the position here is somewhat different and I would not have the presumption to tell you good people how obstetrics should be conducted in these islands. You would, however, permit me to speak of our own experience with our own problem and I am firmly convinced that while a hospital confinement may have a disadvantage, the fundamental requirement of greater security for the lives of the mother and baby cannot be provided in a private house.

The Problem of Large Numbers

There is one teaching problem, large numbers of students. In Sydney we as a university enjoy the doubtful distinction of being the only university in the British Commonwealth which works under an Act of Parliament that does not permit us to limit the entrants to our university. Irrespective of facilities we must in true democratic fashion accept all matriculants.

I am hoping, Sir, that you might be interested to have me recall that it is only 166 years since the birth of white Australia, and 71 years since the birth of Australia's oldest Medical School, (that is Sydney). We have been a robust infant and have grown, you will say, with indecent haste and at a rate that is almost uncouth.

Here is the growth of Sydney University and Medical School since 1883. Total annual figures for all students grew from 100 to 10,000 in 71 years while for medical students it was from 7 to 2,000.

It is interesting to observe the sharp rises following each of the two World Wars and the large number that persisted throughout the "depression" (1930-1931).

The forecast was made that there would be too many graduates and that they would be "half-baked doctors". How wrong was the prophet. As wrong as he was 200 years ago, in this city of London, when William Douglas attacked Smellie's classes of students declaring that there were already "more men-midwives than streets".

The reverse proved to be the case then and now. With us the knowledge that a man was

one of 2,000, for example, in 1948 stimulated a degree of application and hard work never previously equalled.

Not that I really approve of this.

Furthermore, by utilizing more hospitals the size of the bedside teaching group was not only preserved at a reasonable figure but in obstetrics it was actually reduced on the pre-war standard.

This table shows the figures for 12 months at my teaching hospitals.

Obstetric Teaching Hospitals, Sydney

	Number of Births	Average Size of Group	Number of Clinical Teachers per Group
King George V Memorial Hospital	4,222	7·4	5
Crown St. Women's Hospital	6,280	12·4	8
Royal Hospital for Women	4,381	10·4	7
Royal North Shore Hospital	1,962	4·2	4

Prior to 1941 we used only 2 hospitals. You will agree, I am sure, that these figures for births would provide a student over 12 weeks with an adequate pool from which to draw a good experience of the normal and the abnormal.

Except one, every teacher is a Fellow or Member of this College.

Of course we've had our tears. I understand that the earliest university was a guild—a group of people who foregathered to develop the culture of the mind and the search for knowledge and the truth. In very truth for a long time they did not have any such thing as a university building. Now the guild is all buildings, which in their architectural poverty emphasize the technicality of a modern university. The thirst for knowledge is colossal, but thanks to the Gestetner it can be bought in the market.

Gone are the quiet collegiate cloisters, and in their place the one-way traffic and the inevitable queue.

Of course the casualties were heavy because the standard of examination remained high. As a result we were from time to time assailed for allegedly exercising a discriminative harshness in the failures—a regrettable suggestion, and of course quite lacking in truth or originality.

There are other qualities—some might call them the frills—that to my mind are essential in a doctor who treats women in the intimate fashion of an obstetrician and gynaecologist. They are very personal qualities, and I speak of them with a certain reluctance. My remarks, apply, of course, only to my own sex.

An obstetrician should be a gentleman, and wherever else in these crude days chivalry may have disappeared, it must stand firm in obstetrics and gynaecology.

The "bedside manner" so often mentioned with a sniff of amusement, if not contempt, has real value when it accompanies professional skill.

That student earns a professorial frown who, palpating the pregnant abdomen, refers to the "belly" and the "flank". "Those", I tell them, "are veterinary terms".

Proceeding along this personal path on which I have had the temerity to tread I would like to refer to another of its aspects—the sartorial one.

Voltaire spoke truly of many men when he said that "Dress changes the manners". It is interesting to see the improvement that takes place in the sartorial standard between the 1st and 6th years—it is one of the advantages of a long course. Of course I owe it to my teaching staff; they are fine models.

It has, since long before my own student days, been the custom to put on your best suit for your final viva and it had to be a blue one. Indeed it traditionally became known as the "viva blue".

I recall with pleasure the visit to Australia in 1935 of the late Sir Ewen McLean. To the pinnacle of professional quality he added a most pleasing sartorial excellence which made a deep impression on many young doctors—an impression which still persists. Indeed I remember the local Australian Chairman introducing him as the opening speaker at one session of the B.M.A. meeting in Melbourne and referring to the fine clothes of this English gentleman. Sir Ewen's reply, I thought, was a masterpiece. "Ladies and Gentleman, I thank the Chairman—obviously he wants to know the address of my tailor," and turning towards the Chairman and inclining

that well-poised patrician head, he said, "No—Savile Row".

I trust that I am not overstressing this point, but then I cannot put it in a textbook or in the University Calendar. You'll forgive me for putting it in at all, but the niceties can disappear, and I am given courage to refer to the matter of dress by the oldest and justifiably a very proud College in this country, the Royal College of Physicians. They set the standard over 300 years ago when the President of that august College in 1628 gravely admonished Dr. Peter Chamberlen to change his mode of dress and refused his admission until he had conformed to the custom of the College and adopted the decent and sober dress of its members. This, I understand he did, Sir, and was admitted as a Fellow.

But, Sir, I would leave the harassed student there and look at the one who has the conceit to believe that he can teach anybody anything—I mean myself—the teacher.

Thirteen years ago I had the temerity to apply for a Chair of Obstetrics. Having been appointed I set about studying the requirements of a teacher—you might say that I should have examined myself in this respect beforehand—I'm glad I didn't. Had I done so I would never have had the courage to complete my application.

Because, Sir, this, I found, is what was expected of me:

To satisfy the Haldane Commission (1913) I must be able to (I quote): "Awaken the spirit of curiosity and the passion for intellectual mastery which alone could supply the University with fit scholars for its higher work.

"I should give the student a new point of view and enable him to think generally and systematically and fit him for the advancement of knowledge in his subject.

"In addition to teaching and treatment of patients the Professor must give time to attacking the problems of disease.

"The Professor would devote the greater part of his time to teaching and research."

Again in 1918 Sir George Newman's memorandum to the Board of Education believed that the best teacher is also the research man, that "he only is the great teacher who is inspired by the spirit of discovery".

More recently in 1948 the professor found his pattern drawn by the late Professor Noah Morris for the Medical Curriculum Committee of the British Medical Association. He wrote:

"What is ability to teach? Surely the best teacher is the individual who infects his or her students with the best habits of thought, the best technique, the best outlook on life." He continued, "If I were summing up the qualities of a good teacher in medicine I would enumerate human sympathy, moral and intellectual integrity, enthusiasm, ability to talk in addition, of course, to knowledge of his subject."

I think that's grand—that's an ideal. The Committee thought so, too, and rather hopefully made this comment: "More teachers with these ideal qualifications are needed in our schools." I would be realistic and say "some teachers". Remember that I am applying the recommendation to my own country.

In all these reports and memoranda one is exhorted as a teacher "to impart the spirit which should instigate the search of truth, train the student to think for himself, to educate, to draw out, to develop his critical faculties so that he is able to examine the foundations of current theories and beliefs as they are presented to him by his teachers and in the literature of the subject".

This advice is awe-inspiring to a conscientious teacher and in my bewilderment I clutched gratefully at the academic spar that floated up to me from Wilfred Trotter. He rescued me. He said: "There is no aspiration more commonly expressed by conscientious teachers than that they should give their students the power to think for themselves.

"Those who propose to confer this gift of free thought often manifest but little of that activity themselves—but perhaps the oddest thing that is noticeable in these good intentions is a reticence about how they are to be carried out. Pupils are to be taught to think for themselves, but how it is to be done is withheld from us."

A sane and reassuring statement.

But it is also reassuring to recognize that while we are stumbling along the road to obstetric confidence holding our students, it would seem, by the hand, "drawing them out and drawing them on" the practical side of obstetrics has gone ahead over the past half century.

It is of secondary importance to apportion the credit for this, but I doubt if it has been the result of academic exhortation. In my opinion it has been overwhelmingly due to the College Hospital Training.

Would it offend our 20th century pride if I went back to Smellie as an example?

Smellie did not have any memoranda or reports to tell him how to teach, but from all accounts he was very popular and successful. I understand that he had 900 pupils in 10 years —not a bad class. His teaching, I feel, would meet the majority of Noah Morris's ideal requirements, for from descriptions I could believe that he was a kindly, cautious man, a good husband, master and friend, of an artistic temperament. He was enthusiastic and certainly had knowledge of his subject. He was, however, reputedly slow of speech and he avoided disputes! How to do that, however, he kept a secret to himself.

He must have been very human. He once cut the cord on the baby's side of the ligature. But he was canny. He silenced the censorious midwife by telling her that this was his method of preventing convulsions!

He raised the critics' ire because of the originality of his teaching models and methods. This is usually the mark of an inspiring teacher.

What about research? His practical contributions to obstetrics are numerous and notable, and I don't think one would offend his memory or damage his name if I doubted whether he was, as we judge today, a research man. We cannot excuse him because of lack of modern facilities. Research in those days may have lacked some facilities, but on the other hand the field was large. Very little physiology of the body had been explained. Witness the fact that William and John Hunter were quarrelling (in the 1770s) over which brother had discovered the placental circulation. (It is interesting that the quarrel was never settled. John didn't go to William's funeral and—fair enough—received no bequest in his will.)

If it is a pardonable digression, Sir, I do think that professional relationships have improved since those days. It is sad indeed to read the offensive pamphlets that were apparently the recognized ethical vehicle of one doctor's invective against another. And the wheels of the vehicle ran red hot.

They may at times have buried the hatchet, but they knew where it was buried!

But to return to research. The field was large; research was like alluvial gold, to be had for the picking up. Today that has all been cleaned up. Today you have to dig deep to uncover the golden seam of new knowledge. It may require a team; it does require more facilities.

But the point I wish to make is that it is given to very few men to have talents in more than one direction.

Smellie was a great teacher and a great clinician. It is rarely that one can teach and practice obstetrics with one hand, and discover the cause of eclampsia with the other.

That, to my mind, is the outstanding weakness of reports on teaching prior to 1948. They all reiterate time and again the cliche "Teaching and Research" as though they were synonyms. I agree whole-heartedly with the Curriculum Committee in '48 that "usually they are antonyms". The Committee's recommendation is sound "That if a Professor or person in charge of a clinical subject is primarily interested in Research, another person should be made responsible for the actual teaching".

I believe that a clinical chair should in the ideal state, be a twin chair with a Clinical Professor and an Associate Research Professor. The clinical man must be the Chief, for we cannot be cloud-cowled and forget that our first duty is to make obstetricians—to teach students how to deliver babies safely, how to treat post-partum haemorrhage.

As my friend and teacher, F. J. Browne, 25 years ago, has said, "The main duty of a doctor is to cure his patients, and if the patient dies of post-partum haemorrhage it is small comfort to her relatives to know that the doctor had an 'enquiring mind.'"

The research mind is a rare pearl, of great price. The fortunate owner is enthroned on a very high pedestal, the envy and admiration of his colleagues—a really great benefactor of the human race.

By nature he is, and must be, of the diffident mind.

The clinician, on the other hand, must have

confidence; confidence in certain rules of treatment, even if he cannot trace the physiological vein—the modus operandi—that runs through them. But not, of course, that craven credulity that would never doubt authority. And the scientific field can be a happy hunting ground for the charlatan.

Today, Sir, I have lived a great deal in the past. I have done it by design. It was Osler who said, "It is only by a study of the history of a subject that real progress can be made." Progress has been made and I am sure that these giants of yesteryear must be smiling benevolently down on this gathering celebrating the Silver Jubilee of an already distinguished College. Would you, Sir, for a moment allow the play of my imagination? I can see them sitting around the Council table, Smellie we'll put in the President's Chair, guiding the discussion like you, Sir, with tolerance and the kindliest of corrective. On his right is William Hunter, the accoucheur to London's society, insisting on the pre-clinical anatomical requirements for the Membership: "I am a breeder of anatomists" we hear him actually say.

Ah, but here opposite is an interesting spirit—Sir Fielding Ould has just written a textbook, has just been knighted, and would have been even more pleased with himself had he known that a few days ago he had brought into the world a baby boy destined to be the Duke of Wellington.

Next to him is another shadow, Brundenell Exton, M.D.—the friend of the ladies and a brave man. He had just introduced female students into Middlesex Hospital. He is defending his textbook "The System of Midwifery"—the book in which he gave no illustrations because, he is saying, "it is not by sight but by the feel that the parts are to be distinguished".

Opposite sits Sir Richard Manningham—that is if a shadow can sit. He has just brought into existence (1739) St. James' Infirmary, Westminster—the first Maternity Institution in England.

But it will have to be a small Council, Sir, otherwise I shall not finish my address before lunch. We'll just greet a couple of characters.

John Maubray, not such a practical fellow. He has in front of him a copy of the last word in obstetrics. At least the title suggests that inference. His own textbook "Midwifery brought to Perfection"; that happy state was 1726 (with Maubray).

And that character glowering at Smellie from the opposite end of the table. He has a hatchet under his waistcoat; that must be William Douglas.

The spirits have vanished. All is silent—Sic transit gloria. But no! the great and glorious are not all in the past. The sands of time run on, not out; they run down the corridor of two centuries to a new era in midwifery.

It is 1929 and a College is born. In the Presidential Chair is William Blair-Bell. His spirit has since joined his colleagues in the halls of the great. But his memory is fresh with us and today we record in the Blair-Bell Memorial Lecture, our debt to a great man, a man of vision and courage.

The College. Although the College might in a way be termed a Finishing School for an Obstetrician its influence starts long before the graduate actually takes his Membership. It influences universities; it stimulates hospitals to improvement.

In Australia, today, Membership of the College is the hall-mark of a well-trained graduate in the specialty of obstetrics and gynaecology. The universities. hospitals, governmental departments and other institutions, by whose authority the welfare of the public is designed, now recognize Membership of the College as the official yardstick of qualification as a specialist in our subject.

I believe that it has always been the aim of the Founders that this College should be a Commonwealth one. Please forgive me, Mr. President, but we would like to regard ourselves in the Dominion not as "an outpost of empire", but as an integral part of the composite body with our Sister Dominions and with this "blessed plot, this England" which we still call "home".

It is, therefore, with a sense of pride in the extension of the College to other parts of the Commonwealth that I show you a picture of the Australian Headquarters.

This, we would like you to regard as your Collegiate Home when you visit us.

It is the first tangible evidence to the people of Australia—to Governments, to Health Authorities, to our Sister Colleges in Medicine and Surgery, that we have come of age—and fittingly in Silver Jubilee year.

Furthermore, Mr. President, when you, in person in August next, graciously officiate at the installation of the Australian Headquarters in this building, you will forge another link in the chain that binds the units of the British Commonwealth—a bond whose iron strength was so vividly and loyally, if at times robustly demonstrated by Australians to Her Most Gracious Majesty in the earlier part of this year.

And so, Sir, from School through University and Hospital to College, through an orderly planned system of general to specialized education the obstetrician and gynaecologist progresses to the finished product.

Do you believe that? No, I can see you don't; neither do I. He is still unfinished. And why?

I believe there are two kinds of education. The one you are given, and the one you give yourself.

School, University, Hospital and College give you No. 1, but the other—the one you give yourself—is the more important.

And that, Sir, is the final point towards which I have been striving.

Bring back the spirits for a moment. "The education you give yourself" was practically all the early obstetricians had. They learned by apprenticeship, watching it done, doing it.

A very great one wrote 200 years ago of how he learned his job. He said, "I diligently attended to the course and operations of Nature which occurred in my practice, regulating and improving myself by that infallible standard, Nature's."

That principle, you would agree, Sir, is as sound today as when it was enunciated. It was the hard way. There was no Post-Graduate Institute of Obstetrics and Gynaecology to lead them by the academic hand.

Please do not misunderstand me. I am not of the school which thinks we should continue to do things the hard way if there is a simpler way. But we should be careful not to accept the modern way as the best because it is new, and be very careful not to discard the old as obsolete because it is old. Remember the infallible standard. Nature's is very very old.

Twenty-five years ago a young graduate arrived in London from Sydney University. Inexperienced, immature, he sat in this very hall and listened with rapt interest to men and women who had previously been only names on the jackets of textbooks or the pages of a medical journal. Working in University College Hospital, stray words were heard of big things looming in the world of obstetrics and gynaecology. What did it all mean? One day the Professor called me to his office and told me that a College of Obstetrics and Gynaecology was being formed and that certain of my teachers in Sydney were to be invited to become Foundation Fellows and Members. I treasure the privilege of having been a witness to the birth of a Royal College. Two years later, when I returned to Sydney, imagine my consternation when I found a divided opinion on the wisdom of this new creation. I can recall a professor of surgery, now deceased, saying to me, "This new College of yours—it's just a mushroom, of course." But time passed.

We have learned a lot since then; of rivalries, of suspicion, of frustration. And through it all the child thrived. Why? Because there was a need for the College; a need measured in Maternal and Infant Mortality and Morbidity. Where a need exists opposition may delay, but can never halt the inevitable progress of an idea.

Twenty-five years later I have been honoured to come back to the birth-place of the idea and what a proud development I behold. No longer the infant College; now a Royal College. Royal not only in its Charter but in its personnel.

Twenty-five years have accomplished a College. But unfortunately Time does other things. It has taken from our midst some of those great minds and characters whose vision, energy, courage and recognized status in public esteem were responsible for the College.

William Blair-Bell on this Silver Jubilee of *your* College, a Founder, First President and generous benefactor, we salute you and honour your memory.

ELECTION OF HONORARY FELLOWS

Left to right—Professor R. W. Johnstone, Sir Arthur Sims, Dr. Doris Gordon, Dr. Joe Vincent Meigs, The Lord Chancellor Lord Simonds.

Left to right—Professor R. W. Johnstone, Sir Arthur Sims, Dr. Doris Gordon, Dr. Joe Vincent Meigs, The Lord Chancellor Lord Simonds.

ADMISSION OF HONORARY FELLOWS

IN the Senate House of the London University, on 13th July, the following were elected to the Honorary Fellowship:

The Right Honourable Lord Simonds.

Dr. Doris Gordon.

Professor Joe Meigs.

Sir Arthur Sims.

They were presented by Professor R. W. Johnstone in the following terms:

Mr. President,

I have the honour to present to you the following four distinguished persons for admission to the Honorary Fellowship of the College.

THE RIGHT HONOURABLE LORD SIMONDS

The Office of Lord High Chancellor of Great Britain is unique in the British Constitution in respect that its holder is both the titular head of the Judiciary and also one of the highest Executive Officers of State.

Lord Simonds is one of the very few who have reached this coveted eminence without having previously adventured into the fields of politics —he owes his elevation solely to his supreme distinction as lawyer and judge.

The early promise of his notable academic career was more than fulfilled by his eminence as a counsel and later as a Judge of the High Court of Chancery, as a Lord Justice, and as a Lord of Appeal.

I have it on the best authority that it came as no surprise to his profession when in 1951 he was chosen to be Lord Chancellor.

In this great office he has fully maintained its highest traditions, and has discharged its multifarious and exacting responsibilities in a manner which has won the admiration not only of the legal profession but of his political colleagues and of the country at large.

To his superlative abilities as a lawyer and man of affairs he has united qualities of urbanity and tact which have gained for him the esteem and affection of all with whom he has been brought into contact.

Mr. President, Lord Simonds has not hitherto attained fame in the particular science and art to which this College is devoted, and it is with no thought of tempting him into pastures new, still less of opening to him another world to conquer that we have invited him here today.

But he may recall an occasion twenty-five years ago when he acted as our Counsel at the Enquiry held by the Board of Trade into our application for incorporation as a College. That application was opposed by the Royal College of Physicians of London and the Royal College of Surgeons of England, for reasons which seemed good to them at that time, and in putting forward the views of those venerable bodies their Counsel harped at some length on the fact that they had received their Charters from King Henry VIII. Mr. Simonds, as he then was, promptly seized on this argument and turned it to our advantage by pointing out that there was good reason to imagine that, had there been Obstetricians and Gynaecologists in those days, that much-married and sorely disappointed monarch would have been even more willing to grant them his most gracious support and favour.

Whether it was this happy touch that decided the question in our favour or not, the fact remains that we gained our registration; and it is only fitting that, in belated recognition of these services and of the high distinction to which he has since attained, the name of Lord Simonds should be enrolled in the list of our Honorary Fellows.

DR. DORIS GORDON

The career of Dr. Doris Gordon provides an example of the pioneering spirit of the New Zealander.

The most distinguished student in her final year at the University of Otago in 1915, she served as a house surgeon at Dunedin, and was

then appointed University Lecturer in Bacteriology. The insight into the working of the Public Health Department of the Government which this post afforded her was to prove useful in her later activities; for she learned how sensitive such a Department is to the pressure of public opinion, and how, in the ostensible lead which it appears to give to the country in medical matters, it is, and must always be, two or three steps behind the real *avant garde* of the Profession.

Declining a post in the Public Health Department she married, and went into general practice in a farming district in the North Island. In the absence on active service of her husband, she worked alone through the terrible influenza epidemic of 1918, winning general admiration and affection by her skill and her devotion to duty.

Dr. Gordon soon became interested in the movement for analgesia in childbirth. In her remote outpost she studied Gauss's writings on "Twilight Sleep", and tried it out in her own practice, often sitting up all night with her patients to give them the necessary supervision and to gain for herself the necessary experience. The results of this experience were embodied in a thesis which was accepted with commendation for the degree of Doctor of Medicine.

In 1925 both she and her husband came to Edinburgh for post-graduate study, and in due course both obtained by examination the Fellowship of the Royal College of Surgeons of that city—Dr. Doris Gordon being the first Australasian woman to obtain a Fellowship in any Royal College.

On her return to New Zealand she mobilized women's opinion in support of improved conditions in maternity hospitals, and by her informed leadership persuaded—or perhaps, more accurately, compelled—the Government to adopt that policy. In 1927 Dr. Gordon was instrumental in founding the New Zealand Obstetrical Society, and it was she who induced Mr. Victor Bonney to visit the Dominion. Largely as a result of her briefing, Mr. Bonney gave wide publicity to the need for a whole-time Professorship in Obstetrics and Gynaecology in New Zealand; and, despite inertia and even active opposition in responsible quarters, Dr. Gordon again mobilized her fellow women to raise the funds to endow such a Chair. So successful were they in that peculiarly feminine pursuit that a sum of over £31,000 was collected, and in 1932 the new Chair received its first occupant in the person of Dr. (later Sir) Bernard Dawson.

After the Second World War Dr. Gordon was once more the prime mover in getting the Post-graduate Chair of Obstetrics and Gynaecology established in Auckland.

Seventeen years ago Dr. Gordon, who was one of the Foundation Members of this Royal College, was promoted to the rank of Fellow; and now, Mr. President, with this truly remarkable record of great and fruitful public service in the interests of Obstetrics and Gynaecology standing to her credit, the College desires you to pay her in their name the further compliment of admitting her to Honorary Fellowship.

Professor Joe Meigs

Ever since the days of Marion Sims, American gynaecologists have been travel-minded; and in our days, with a world so contracted that Massachusetts and Middlesex are within week-end visiting range, the two-way traffic of obstetricians and gynaecologists has become a large and steady stream. The resulting interchange of ideas has been wholly beneficial, and fortunately in that realm the exchange is free and questions of convertibility scarcely arise.

In the twenty-five years of its existence this College has been privileged to play its part in the maintenance of close ties of friendship between our British Commonwealth and the United States. In the same period several American obstetricians and gynaecologists, of what might well be called ambassadorial standing, have become Honorary Fellows of the College—John Whitridge Williams, William P. Graves, George Gray Ward, Emil Novak, and George W. Kosmak.

Today we welcome, as a man of similar calibre in character and intellect, Dr. Joe Meigs, Associate Professor of Gynaecology at Harvard University.

More than a century ago American Gynaecology derived no mean lustre from an earlier

member of the same family, who became Professor of Obstetrics and Gynaecology at Jefferson College, Philadelphia. Today we salute Professor Joe Meigs as one of the brightest stars in the medical constellation of Harvard University.

In addition to enriching our professional literature with his writings, Dr. Meigs has been responsible in great measure for the world-wide acceptance of the smear technique in the diagnosis of cancer of the cervix, and in the earliest possible detection of that fell disease while it is yet in the precocious stage of *carcinoma in situ*.

In the sphere of Clinical Gynaecology Professor Meigs has another and a rarer distinction. He has become an *Eponym*—by the general association of his name with that interesting syndrome of hydroperitoneum and hydrothorax with benign solid tumours of the ovary.

It seems almost superfluous to record that Professor Meigs is a Fellow of the American College of Surgeons, the American Gynaecological Society, and the American Association of Obstetricians, Gynaecologists and Abdominal Surgeons. But even more significant is the fact that he was the prime mover in founding the exclusive and esoteric body known as the American Society of Pelvic Surgeons, for in the realm of radical gynaecological surgery Joe Meigs has made himself one of the world's outstanding leaders. Whatever differences of opinion may be held in regard to exenteration, there is no gynaecologist who can fail to have the most sincere admiration for the man who is able to record, as Professor Meigs has done, a series of 100 consecutive Wertheim operations without a single operative death.

Dr. Meigs's unsurpassed dexterity and skill as an operator are matched by an unerring instinct in the choice of young men to train up in his methods. Already he has to his credit quite a number of disciples in important hospital and research posts throughout the United States. One of these has told me that one of Dr. Meigs's outstanding characteristics is his unfailing kindness and consideration towards his juniors. Little wonder is it that a man, who has that reputation among his own immediate associates and colleagues, is hailed as one of America's great ambassadors of international goodwill in the gynaecological world; and it would be gratifying to us, Mr. President, to have his name now added to the Roll of our Honorary Fellows.

Sir Arthur Sims

In the variegated tapestry of Sir Arthur Sims's life there is much both in line and in colour to catch the eye and kindle the interest of his fellow-countrymen in both hemispheres. The "success story" of the poor lad who achieves wealth and position is always popular, and, when the same youth combines outstanding distinction at national games with business success, the appeal of his life-story is assured. To add that in all his affairs the hero proved himself a man of wide-ranging vision and statesmanlike foresight is to give it the essential ingredients of a best-seller. Such is, however, the record of the man I now have the honour to present to you.

Shortly after his birth in this country Arthur Sims's parents emigrated to New Zealand—a point which suggests at once the source of that spirit of enterprise which has made him a natural life-member of the gallant company of pioneer merchant-adventurers.

As a youth he had two passions—the study of science and the playing of cricket, but *res angusta domi* compelled him to make the getting of a livelihood his main concern, and cricket and study were forced into side-lines. Even so they led him to high distinction, for his spare-time studies enabled him to obtain the degree of Master of Arts with the highest honours in Industrial Chemistry at the University of Otago. Along the other side-line his attainments were no less spectacular, for he captained New Zealand at cricket, made a record eighth wicket partnership with the great Victor Trumper (the score being the remarkable one of 433 runs, of which Sir Arthur's share was 184 not out), and in this country played in the same club with the immortal W. G. Grace himself.

But from these alluring side-lines I must return to the main line, along which Arthur Sims was building a fortune—by refrigeration and the export of mutton and lamb from New Zealand, by sheep-farming and, dare I say, wool-

gathering on a colossal scale in Australia, by ranching and afforestation in Africa, and by wool manufacturing in this country. Arthur Sims found that he had in commerce the counterpart of "green fingers"; things grew and flourished under his care, and in the garden of his business life he now has some score or more of large and thriving concerns.

His mother, who foresaw that he would become wealthy, reminded him that of the man to whom much is given much is also required; and following that sage and pious guidance he has devoted a great deal of thought to the wise disposal of his wealth. Education in Science and Medicine made a special appeal to him and right nobly has he endowed his own University, and in this country the cause of medical advancement, judiciously choosing the Royal Colleges as channels of his benevolence. By the happy device of Travelling Professorships he has spread the benefits of his endowments over the whole commonwealth. We in this College have much to thank him for, and, if the whole truth be told, not only Sir Arthur himself, but also Lady Sims and their daughter Mrs. Black; for I understand that in this difficult problem of the distribution of his wealth he very wisely turns to his womenfolk for guidance.

Mr. President, there is a well-worn Wordsworthian saying that "Getting and spending we lay waste our powers". I venture to assert that it is not always true. In Sir Arthur Sims we have a shining example of a man whose getting on a very large scale and whose spending on an equally high level of munificence have neither laid waste his powers nor blinded his vision. It is as such that we desire you to honour him now with the award of our Honorary Fellowship.